The Builder.

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The Hellenic Society.

THIS Society, whose full title is "The Society for the Promotion of Hellenic Studies," has now been in existence for, we believe, something over four years, and held its first meeting for the present autumn session on Thursday afternoon last. Though the Society includes in its list of members not a few distinguished names, and has put forth a Journal which, for weight of matter and beauty of illustrations, stands high among European archæological publications, its existence and its doings seem in England to attract but little notice beyond the circle of those specially-informed people who make up its not too numerous ranks. A report of its annual meeting appears, perhaps, periodically in the leading daily paper, and the "general reader" wonders why people should get together and discuss with such apparent interest the paintings on an ancient jar, or an unexpected discovery of an inscription in some out-of-the-way corner in Asia Minor. And had there always been Hellenic Societies and British Museums, we should not so much require them now. But whole centuries passed away, during which it was forgotten that people called Greeks ever lived on European soil, and left behind them the brightest legacy of perfection in art and literature that any race of men has left. Their exquisite buildings have been allowed to go to ruin, or have been wantonly defaced and destroyed by violence; much of their glorious literature has disappeared, never to be recovered; and now, when it is all but too late, the modern educated world has awakened at last to the fact that all remnants of that age of joyous artistic insight and achievement are precious, either for their intrinsic beauty, or, in the case of archaic work, for the light which they may throw on the early history of Europe, on the development and race-connexions of the Greeks themselves and of contemporary peoples, on doubtful points of philology and archæology, and on the genesis of the European art of which the Greeks are the founders; and the cry among those who appreciate the interest of such relics is, "Gather up the fragments that remain," that at least nothing be lost of what remains to find, which may prove to be more than we can at present estimate.

The objects of the Society for the Promotion of Hellenic Studies, as stated in their "Rules," are (1) to advance the study of Greek language, literature, and art, and to illustrate the history of the Greek race in the ancient, Byzantine and neo-Hellenic periods, by the publication of memoirs and un-edited documents or monuments in the journal of the society; (2) to collect drawings, transcripts, photographs, &c., of Greek inscriptions, MSS., works of art, and ancient sites and remains, inviting the co-operation of travellers in communicating notes of what they have observed; and (3) to organise means by which members of the society may have increased facilities for visiting ancient sites and pursuing archæological researches in countries which at any time have been the sites of Hellenic civilisation. A considerable portion of this programme, as the Journal and illustrations for the past year sufficiently prove, is in the way of being realised. A further object which the society has much at heart, and which was specially referred to by the President, the Bishop of Durham, at the annual meeting in June last, is the establishment at Athens of a British school or institution for Hellenic research. Until, the President observed, there was such a centre of work established on Greek soil, Hellenic studies in England would be at a decided disadvantage. In an article not long since we referred to the melancholy fact that at Rome the archæological visitor knew only too well that it was to the German Archæological Institute that he must betake himself to have the latest and best news of archæological exploration. The want of interest in such subjects evinced by the English Government is but too well seconded, in the negative sense, by the indifference of the British public. Men who are supposed to represent both culture and wealth will spend disproportionate sums on curiosities in china ware, which are of comparatively recent date and inferior artistic worth, but can find nothing to bestow in assisting such a research as that of Mr. Wood at Ephesus, after the poor pittance granted by the Government had been exhausted. An increased membership of the Hellenic Society, a wider circulation of its publications, and a more general public recognition of its objects and of the work it is doing, might do something to break through the apathy of even the educated portion of Englishmen on this subject. The increased attention which has of late years been paid to archæology in our universities, more particularly at Cambridge, will no doubt have its effect in time; and, as Mr. Newton said at the annual meeting before referred to, the hope is that young men are now being trained at our universities who will be in time competent to carry out the work of exploration. For twenty years past, he observed, there had been in France and Germany a constant succession of young scholars, first sent to the schools at Athens, then upon special missions, and in course of time promoted to chairs of archæology at the different universities; and it is a significant fact, as was observed in our columns not long since, that German is now almost the recognised language of archæology.

Looking through the last volume of the Society's Journal, we observe that architectural subjects do not at present occupy a very large portion of its attention; and in connexion with this fact we may observe that the name of the author of the most valuable work on Athenian architecture that has ever appeared is not on the list of members. Whether this is because the Society does not know Mr. Penrose, or that he does not know the Society, we cannot say; but either way the omission is to be regretted. But we rather fear it is with Greek archæologists as it is with other people,—architecture is one of the last subjects connected with the arts in which interest is felt. It may be added, perhaps, that Greek architecture has been a great deal studied and illustrated already, while the systematic study of Greek sculpture is only of recent date, and there are many very interesting problems connected with it at present demanding solution. There is a passage of arms in the Journal between Professor Sayce and Dr. Jebb in regard to Hissarlik, in which the latter sums up to the effect that while the large pre-Ilian settlement, of which remains exist at Hissarlik, "*may* be that town the capture of which at an unknown date gave rise to the legend of Troy, the data of the Homeric poems for the *site* of Troy cannot be really reconciled with any one site in the Iliad. Some of them suit Bunâr-bashi only; others suit Hissarlik best. The *town* adumbrated in the Iliad is, in all its architectural details, purely poetical. . . . Homer's Troy, in the sense of an actual town, described by a poet recording historical fact, has *not* been found at Hissarlik, and will never be found anywhere." To which we may say, with Sancho Panza,—"God bless me, did I not tell you so?" But the contributions on subjects specially architectural are interesting, though brief. One is a description, accompanied by very full drawings, of a small prehistoric building near Salamis, which has been measured and drawn by a German gentleman, Herr Ohnefalsch Richter. It is a chamber of about 35 ft. by 20 ft., of Cyclopean masonry, and with a circular barrel-vault and a small chamber leading out of it cut in the rock, which latter has been roofed by an immense monolith, flat in the first instance, but from which a sloping roof, gable-shape, has been worked half out of the soffit of the stone and half out of the rock on which it rests. Though the main chamber is rectangular, the resemblance of the whole construction, in general idea and plan, to

those of which the "treasury of Atreus" is the best-known example, is certainly striking. It has been supposed by some to be a tomb, but there is a hollow cut inside in the ponderous stone lintel, communicating with a kind of portcullis groove in the lintel and jambs, which was evidently a provision for closing the opening with some kind of door from inside; and, as Herr Richter pithily says,—"Dead men cannot close a door." A communication by Dr. Waldstein, curator of the Fitzwilliam Archæological Museum, on "Views of Athens in the year 1687," is of considerable interest. It is in relation to two sketches in the library of the late Sir Thomas Phillips at Thirlstone House, Cheltenham. These views, from an old book of sketches done by some unknown Italian visitor, show the distant Parthenon in the fourth period of its consecration, as a Turkish mosque,* with a tall minaret added, which figures conspicuously in both sketches. The Parthenon was a mosque from 1458 to September 26, 1687, the ill-fated day when the Venetian mortars succeeded in sending a shell into the temple and igniting the powder stored there. There are letters extant showing that among the officers concerned in the attack were some who had an interest in art, and it is conjectured that the drawing published in the Journal was a sketch from a distance by one of these officers before the event of the bombshell. The larger sketch is a kind of half plan, half view, of Athens, with the fortification of the Acropolis shown, and the city on the sloping ground below; the Temple of Theseus, the Piræus, and the long walls, are indicated. The vignette from the same book of sketches is also given, showing a kind of picture-frame design, with a roughly-sketched head-piece in which are represented the owl in the centre, and Athene and Poseidon seated on the slopes of the frame on either side; below, in the square centre-space, is the sketch of the Acropolis alone, from nearly the same point of view as the other. The sketch is on a very small scale, but there is an attempt to indicate something on the roof, more than mere straight lines, which is deserving attention. Dr. Waldstein refers to a drawing by Herr Von Duhn in the *Mittheilungen* of the German Archæological Institute at Athens, in which three small "opaia" are visible in the centre of the roof, and refers to the possible bearing of these indications on Mr. Fergusson's theory of the lighting of Greek temples. There are on the little frontispiece sketch published in the Journal certain dots along the roof, to which Dr. Waldstein does not refer, but which must mean something. They may be only an attempt to indicate the effect of the *antefixæ;* but it seems a question whether the antefixæ could be prominent enough, at the distance from which this sketch must have been taken, to attract the notice of a draughtsman making a rough sketch on a small scale.

Among the most interesting of the papers bearing on ancient art generally, in one on two archaic sarcophagi found at Clazomenæ in 1882, the designs on which are reproduced both by cuts in the text and by a finely executed monolithograph among the larger separate plates; and there is a paper by Mr. Percy Gardner on a very beautiful statuette of Eros, of gilt terra cotta, which was presented by the King of the Hellenes to the Princess of Wales, and which Mr. Gardner believes to be probably a copy of a modification of a design of Praxiteles. A very interesting and thorough article by Miss Harrison, on "Monuments relating to the Odyssey," deals with certain representations in vase paintings of the escape of Ulysses and his companions from the cave of Polyphemus. Miss Harrison is proposing, we observe, to classify the existing illustrations of "the whole series of myths of the Trojan cycle"; such a compilation from so thorough an investigator will have a lasting value. The finest illustrations published among the separate plates are, however, the chromolithograph reproductions of the paintings of the sarcophagus found at Corneto in 1869, and now in the Egyptian and Etruscan Museum at Florence. The lithographs are by Steinbock, of Berlin, and are alone sufficient to make the album of plates worth possessing; the figures, though all partly obliterated, are very fine and powerful in action and expression, and the execution of the plates is splendid. Plate xxxvi., where a very beautiful Amazon turns round on her horse to strike at the man behind her, is especially noticeable. These paintings, which belong to a late period of Greek art (probably about 300 B.C.), are far more pictorial than the conventional and more decorative vase paintings which are generally associated with the idea of Greek painting; the features and figures being delicately modelled and shaded.

Since the previous remarks were written we have learned that the Committee for Promoting the Formation of an English Archæological School at Athens, which is officially a separate body from the Hellenic Society, have received a free grant of a piece of land for the purpose from the Greek Government, the enclosure of which will be carried out immediately, and that they have collected 4,000*l.* towards building and enclosing the proposed institution. This, of course, is not a fifth part of what will be required, but we have got thus far on the way; and it is to be hoped that others who are able to do so will give speedy and substantial assistance to enable England to take as honourable a place in the strife for knowledge as Germany has already taken.

Of the meeting of the Society on Thursday afternoon we can necessarily only speak very briefly. Mr. Newton occupied the chair, and a very interesting paper was read by the head-master of Eton, the Rev. E. Warre, on the raft built by Ulysses to escape from Calypso's island. Mr. Warre, who joins a knowledge of boats and boat-building to Greek scholarship, went, in a very detailed and practical manner, into Homer's workmanlike description of the construction of the raft, and illustrated his remarks by a model, showing the conjectured shape and method of construction, and by some copies of Egyptian drawings, showing certain forms of tools, of which also models had been made, reproducing the ancient tools in actual working form. This paper was followed by one from Mr. Ernest Gardner on some of the objects found in tombs at Kertch, and now in the new museum at Oxford. The special value of these is that they serve to represent, to those who have not been to St. Petersburg to inspect the rich collection of archæological treasures from Southern Russia, the type of work which is mainly characteristic of the Hellenic remains in that part of Europe. The paper was illustrated by several pages of lithographed plates, which will, we presume, eventually form a portion of the Society's Journal, and which represent a good many beautiful bits of decorative work in the way of personal ornaments (found in the tombs of women), almost purely Greek in style and feeling, though presenting some special peculiarities which added to their interest. Mr. Gardner remarked on the extreme delicacy of the gold-work in many of these ornaments, the gold being only a thin sheet *repoussé*, and in some cases ornamented with minute spirals of gold wire made separately and applied to the surface. Of course all who are familiar with Greek gold work are aware of this characteristic of the sparing and delicate use of the metal, and we have often commented on the contrast between this and the goldsmith's work of to-day, when the object seems to be to have as much bullion in proportion to the real art work as possible.

We hope the Society for the Promotion of Hellenic Studies will ere long enlarge its borders, and also that it will be able to take up and throw additional light upon some of the interesting questions concerning ancient Hellenic architecture, which should receive its due proportion of attention among the other branches of archæology which are included in the field of Hellenic study.

* As most of our readers know, the Parthenon has been successively a temple of Athene, a Greek church, a Romish church, and a Turkish mosque.

THE LIFE OF SIR HENRY COLE.*

HALF a century of genuine work is something for the doer of it to look back upon with satisfaction, and it must be conceded that Sir Henry Cole was fairly entitled to indulge in this feeling. There may be more than one opinion as to the character of some of his work, but all will agree that it was executed with energy. Energy, indeed, when it shows itself in the form of restless desire to set things and people straight, is apt to make a man fussy and self-important, and if, in addition, he be a little too conscious of his own merits and a little too fond of the smile of the great, the shafts of hostile criticism are likely to fall pretty thickly around him. But, happily for himself, Sir Henry had not the sensitive nature of a poet, and so the remarks in which Saturday Reviewers indulged, and which were often "tartarly" enough, seldom ruffled his temper and never provoked a retort.

> "Populus me sibilat, at mihi plaudo
> Ipse domi."

He went his own way, displaying ever a cheerful optimism which neither hard words nor hard work could impair.

Cole had done substantial service to the State in more than one department before the Great Exhibition of 1851 brought him into public notice. He helped to organise the Public Record Office, and was associated with Rowland Hill in the reform of the General Post-office. Quick to see anomalies and abuses, and fertile in plans for their removal, his aid was most acceptable to those who were fighting the battle of progress. He knew, too, the value of ridicule, and,—notably in the contest about Railway Gauges,—employed it with signal success. A good cartoon or a page of pungent satire from the pen of a Thackeray could, he thought, influence public opinion a hundredfold more than infallible figures or the most logical arguments.

The special work, however, with which Sir Henry Cole identified himself from an early date was the application of the Fine Arts to the manufactures of the country. He saw that while English productions had a high reputation for cheapness and intrinsic excellence, they were deplorably deficient in beauty of design, in symmetry of form, and harmony of colouring. What, then, he set himself to do, and what he urged the Society of Arts to take in hand, was,—in his own words,—"to wed high art with mechanical skill, or to bring about the union of the artist with the workman." It was in furtherance of this idea that the International Exhibition of the products of industry was set on foot. At the outset very little else was proposed than a merely National Exhibition, but Prince Albert very quickly saw that the object which they had in view would be best secured by gathering together under one roof the productions of all countries, thus bringing into high relief our neighbours' excellences and our own defects. The marvellous success which attended the execution of the idea has been somewhat lost sight of in the crowd of events that have since happened. It is one of the advantages of this memoir that it brings together, in very readable fashion, contemporary records of all that occurred in connexion with the Great Exhibition of 1851. We may, perhaps, demur to Sir Henry's statement that "no event comparable to it in its promotion of human industry is to be found in the history of the world," but at least it must be allowed that it gave an impetus to English manufacture which is still felt, and did much to promote that union between "high art and mechanical skill" on which the enlightened mind of the Prince Consort was largely set. It is amusing at this distance of time to read of the various panics which the scheme created in men's (and women's) minds. The public were assured by the Astronomer Royal that Paxton's glass house must by demonstration infallibly fall to pieces.

* "Fifty Years of Public Work of Sir Henry Cole, K.C.B., accounted for in his Deeds, Speeches, and Writings." Two vols. London: G. Bell & Sons. 1884.

The Duke of Wellington brought 10,000 additional troops into the neighbourhood of the metropolis to deal with apprehended disturbances. Colonel Sibthorpe, in the House of Commons, prayed that hail or lightning might descend from heaven to defeat the ill-advised project. Telegraphic arrangements were made between the Executive Committee and the Police Commissioners, to deal at any moment with the unruly mob; but, adds Sir Henry Cole, "these curious devices were never employed; and it may be said that the great building, even with 93,000 persons in it at one time, was never so crowded as a lady's successful *soirée*."

As to the results of the Exhibition we have Cole's own opinions, as given in a lecture delivered in December, 1852. He expressed his belief that in the domain of art England had learned most from the Eastern exhibits, while in mechanical appliances America had taught her some valuable lessons. Insular prejudices had been lessened, competition in new fields of labour had been suggested, and the inter-communication between countries by a general postage system had been largely promoted. The lecturer would have done wisely if he had contented himself with these conclusions, and abstained from the perils of prophecy. Unfortunately, he went on to say that the Reform of the Patent Laws would be a speedy result, that open councils would be substituted for secret diplomacy, and that nations would be kept back from going to blows as hastily and foolishly as they have been accustomed to do. From the last and happiest result we seem to be as far off as ever, but its realisation then seemed possible to many minds. Lord Macaulay expressed the prevailing opinion when he said,—"This will long be remembered as a singularly happy year of peace, plenty, good feeling, innocent pleasure, national glory of the best and purest sort."

With the later exhibitions of a similar kind both at home and abroad Cole was necessarily much associated. He advocated the adoption of an arrangement of "like objects with like objects" as being more scientific and technically useful than the geographical system. But it involved more cost and labour, and was neither so picturesque nor so popular. The exhibitions held in 1871 and the three succeeding years were financial failures, though each was, so far as manufactures were concerned, an improvement upon its predecessor. But as the quality improved, the novelty wore off, and, however technically instructive they may have been to the few, they ceased to be attractive to the many.

Sir Henry Cole's services at the Science and Art Department and South Kensington Museum were of a more enduring character. The former was rather the consolidation of a number of existing institutions than the creation of an absolutely new one. The oldest of these institutions,—the Royal Dublin Society,—had been in the receipt of an annual public grant from the year 1800, and elsewhere there were numerous schools and museums which were practically without control, though nominally under the Commissioner of Public Works or the Board of Trade. All these, re-organised and developed, were placed under the Committee of Council of Education, and no little credit is due to Henry Cole for the share which he bore in carrying this arrangement into effect. A genuine interest in technical training, immense industry, a clear head for details, and excellent health, were the chief qualifications which Sir Henry possessed for the posts which he occupied, and that they were occupied with credit to himself and with advantage to the State these interesting volumes abundantly testify.

As an artist and an architect Sir Henry will not be remembered; indeed, if the "Brompton Boilers" were in any degree his work,—and his son assures us that they were not,—it were well that he should be forgotten. His letters and lectures on architecture, which are republished in these volumes, are chiefly useful for certain practical suggestions, but whether the appointment of a Council of Taste to advise on public buildings be one of these is, to say the least, a question to be asked. The establishment of a permanent Minister of Arts we have often advocated; but that is not quite the same thing.

WHAT THE HOUSEKEEPER REQUIRES FROM THE ARCHITECT.

THE rapid increase in the number of inhabited houses in England is a fact as noticeable from a financial as it is from a pictorial point of view. As to the latter, the up-growth of houses in many districts traversed by our great railway lines is such as to force itself even on the attention of the traveller, who may, perhaps, be limited to an annual survey from the windows of a flying train. Land which a few years ago was waste is now dotted with houses. Villages are growing into towns. Towers, and spires, and cupolas pierce the sky; and red brick "Queen Anne" houses are toning down so as to assert an imaginary antiquity. The gross estimated annual rental of England, for 1881, as valued for the poor-rate, exceeded that of 1880 by no less than 4,894,000*l.*; and although this was an exceptional spring, due in part to new valuation, the rental of 1881 exceeded that of 1871 by upwards of 38,000,000*l.*

Activity of all kinds concurs in this rapid planting of brick and mortar. Here we see the commodious mansion, reared, regardless of cost, under the eye of some magnate of the architectural profession. There we see the questionable, or even the unquestionable, work of the speculative builder. Distinct from either of these, in very different parts of the country, rise what may perhaps best be described as amateur houses,—that is to say, dwellings reared, often by retired or well-to-do tradesmen, either for their own abode or as a means of investing their savings. Many of these are built with scant aid from the architect. Sometimes a young man may be induced to act on reduced terms. Sometimes a succesful foreman will develope into a builder, who asks no advice but his own. Sometimes a clerk of the works is employed by the owning builder.

It is chiefly in cases of this kind that a very serious inconvenience is arising, and in some places rapidly increasing. This is the practical unacquaintance of the builder with the requirements of family life on different scales. In every well-ordered establishment, great or small, a certain organisation exists, which ought to find its counterpart in the plan of the house. Probably the best scale by which this organisation is to be determined is that furnished by the number of servants. A house intended to be kept in order by two or three servants is not to be converted into one proper for the employment of seven or eight merely by adding two or three sleeping-rooms. The whole theory of the building differs. And in the amateur houses to which we refer, not only is there a want of keeping in this respect, but very often two or three good reception-rooms are combined with such stinted accommodation for offices of all kinds as to make a house, for which the rental proper for a family of some considerable *status* is asked, totally unfit for the daily requirements of such a family.

We are no believers in the hand-book system, when it is regarded as the means of enabling the purchaser to act for himself, without taking proper advice. Quackery in architecture is likely to be little less disastrous than quackery in medicine. The well-known qualification of the man who is his own lawyer may generally be taken to apply to the man who is his own architect. But with that caution, we cannot but think that there is room for some such guide for the builder as that which the Italians have devised for the railway engineer. The normal dimensions of platforms, ticket-offices, refreshment-rooms, and other station accommodation for railways of different capacities for traffic are now laid down, on the Italian lines, with accurate prevision. It would be of no little use to the young architect if he could refer to a like outcome of experience as a guide to the plan of a house.

As to the rooms that come *en évidence*, dining-room, drawing-room, study, or morning-room of some kind, sleeping chambers, hall, staircase, and kitchen, there is, probably, little to be said. Every one,—or, at least, every one who can "drive a gig," may, perhaps, have a right to indulge his or her own taste so far. But the above-named apartments do not form a house, though they often compose what goes by that name. First we should be disposed to rank among neglected specialities the arrangement of nurseries. A certain elasticity, no doubt, is here proper. But then the need for that elasticity should be kept in view from the first. Leaving an ordinary bed-room unfurnished is not the way to provide that essential to the healthy growth of children,—a light, airy, sweet, dry nursery. A room may be suitable for a servants' bed-room which will be very unsuitable for a night nursery. The combination of the two, that is to say allowing the children to live and to sleep in the same room, is a source of permanent mischief, which would be well avoided at the cost of sacrificing a boudoir, a study, or a morning-room.

Again, the want of a servants' hall is a very serious defect if (say) more than three servants are kept. So is the absence of a second staircase. So of the want of housemaid's pantry, china-closet, butler's pantry, linen-room, laundry, dairy, box-room, knife-room, coal and wood stores, scullery, and all the other requirements of the inmates of the kitchen. Health, economy, and comfort are as much involved in the ordering of this series of domestic conveniences as in the arrangement of those rooms of which the number and size are duly advertised.

A sort of rough normal specification, based on the number of servants that the house demands for its thorough keeping, might be so constructed as to be of no little value. In this not only the actual number of rooms required, but some rules for their convenient area, might be given. Thus a distinct step should be made when it is intended to lodge men-servants within the house. The size of the servants' hall should be in proportion to the number of servants. Of stable and coach-house we have not spoken, as they should not come under the general roof; but here proportionate accommodation should be indicated. And if the actual arrangements of houses known to be fully adequate to the comfort of their occupants were cited as examples, we think that a very valuable work might be written on the theme of "What the Housekeeper requires from the Architect."

NOTES.

THE verdict in the case of the disastrous gas explosion in Bermondsey seems to us a remarkably feeble one. The Coroner, indeed, appears to have commented strongly on the conduct of the Board of Works in not sending any representative to the inquiry, as it had been stated that the leakage of the gas-main was in the first instance due to the insufficient support over their own sewer works; and the jury "censured" the gas company for not seeing that the main had been properly replaced by the sewer contractor,—a matter in which their interest, as well as their duty, might have been thought to be concerned. But when we come to the direct cause of the explosion, viz., the search for the place of escape by the gas company's servant with a naked light, a proceeding the rashness and folly of which has been condemned over and over again, and is apparent to the commonsense of even untechnical persons, mere "censure" is far below what the case calls for, and a verdict of "accidental death" is what we call little short of a miscarriage of justice. How can we expect that such gross carelessness and stupidity can be put a stop to, when death caused thereby is regarded by the law as an "accident"?

A CORRESPONDENT asks the meaning of "prime cost" as mentioned in specifications. Paperhangings are troubling him as they have so often troubled others. He

wishes for decisive information,—whether the price marked at the back of the pattern by the manufacturer, or the net price charged to the trade at the warehouse is really the "prime cost." It is to be feared that the answer cannot be given as desired. In view of this difficulty architects,—who do make prime cost provisions in their specifications for stoves, chimney-pieces, gasfittings, ornamental glass, ironwork, &c., — generally put an explanatory sentence of this sort: "prime cost prices are to be understood as the actual cash payments made by the contractor to the manufacturers, and the contractor is to make his own provision for profit, carriage, packing, &c., and fixing, in the preparation of his estimate." Frequently, in order to make things very clear, the paperhangings have a special note in addition. The discounts, amounting to one-third or one-half (and even three-fourths in the case of old machine-made papers), are answerable for this amplitude of explanation; and the note probably runs thus, "the prices of paperhangings are to be understood as being the current nominal retail prices of good manufacturers." Without these precautions the question is sure to be raised, and to be slurred over in a spirit of compromise, or decided by an arbitrator who tries to gather from the documents and by evidence the real intention of the parties to the contract. Many architects dislike such explanations, looking on them as cumbrous, and, in the case of prime cost being defined as actual cash payment, having a tendency towards looking unduly behind the scenes, and controlling the contractor's skill in buying and paying, and denying him the little advantages which he can secure by special bargains and cash payments. These architects, therefore, content themselves with providing sums, and the goods selected will cost those sums at retail prices; the contractor may then make his own terms and pay accordingly. If the architect finds that the employer is not likely to get good value at a place selected by the contractor, another place will be selected, and better value obtained,—always for the retail prices. Unfortunately the system of trade discounts is much misunderstood. Judges on the bench have in our hearing protested against the discounts, thinking them the same thing as "secret commissions," and thus looking on them as one might on the receipt of a consideration to do evil. They are, in fact, allowances to constant customers who do a fair amount of business, and are served at less cost, and with more satisfaction, than chance customers who buy one thing and never come again.

THE interesting and varied series of water-colour sketches by Mr. Ernest George, which are now being exhibited at the rooms of the Fine Art Society in Bond-street, should be attractive alike to architects and amateurs. They represent many phases of Mediæval architecture on its picturesque side. The work of an able architect, the drawings will be regarded with confidence by architects as likely to be trustworthy in detail, while to the amateur they represent that view of architecture which all persons with a cultivated taste for what is characteristic and picturesque can appreciate, even without any knowledge of architectural history and construction; though, of course, such knowledge will add very much to the interest of the collection. In one sense only the drawings differ from what a painter, as distinguished from an architect, would have produced; for Mr. George, looking mainly to architectural form and character, works with a restricted palette and with apparently little regard to effect of climate and atmosphere, so that the Scotch and Spanish subjects, which are side by side, seem to belong to the same climate. The drawings, which number nearly 300, and are, we understand, only the work of brief holiday periods, show a remarkable facility of work, in addition to the artistic power and effectiveness of many of them. They afford also a very interesting comparative view of the characteristics of picturesque architecture in the various countries of Europe. We come from the Château de Chambord (25), with its mixed expression of refinement and tyranny, to the old street at Vitré (43), with its piers and beams made before the day of competition estimates; from San Gemignano with its brutal chimney-like towers, emblems of ferocious warfare only, to the elegant campanile of the Renaissance and the octagon towers of Spain; and so on through a score of significant contrasts. All architectural students should look at the collection.

MR. RUSKIN commenced last Saturday at Oxford his series of lectures on "The Pleasures of England," which, in other words (for Mr. Ruskin happily never says anything like other people,—"for which relief, much thanks"), means a sketch of the art history of England, regarding art from the people's side, as representing what they really took "pleasure" in at various times. Of course Mr. Ruskin looks at the subject from a moral and not from a merely "art-critical" point of view. His opening lecture was on "the pleasures of learning," by which we presume he means the period when early Saxon England was slowly learning an art from the vague and half-forgotten hints which had made their way from the fields of the dead Classic art. Curious, as Mr. Ruskin suggests, to consider what we might have been "if no Roman missionary had ever passed the Alps in charity and no English king in pilgrimage; what the clay of the Isis might have yielded if it had never been touched by the spear of Pallas and the rod of Agricola." The course of lectures will probably be of great interest and full of brilliant suggestions, but we regret to observe that the concluding one, on the mechanical age of to-day, is entitled the "Pleasures of Nonsense." It is regrettable that any one of Mr. Ruskin's earnestness and eloquence should deliberately refuse to see how much of greatness, of energy, of healthy influence there has been in that era of machinery which he despises, partly because he does not understand it.

FEW artists, even among those of marked ability, will bear the trial of having a large number of their works exhibited together, and Mr. Ernest Parton is not one of the few. A number of oil studies from nature by this artist are now on view at Messrs. Dowdeswell's. Seen separately, they would impress us, as Mr. Parton's finished pictures do, as the work of an artist with a true feeling for nature, and a style at once broad and delicate in its translation of natural beauty through the medium of oil painting. But the collection of 100 of his studies together shows that, beautiful as they are in style, the artist's powers move within rather narrow limits. Nature is always the same colour to Mr. Parton, whatever scene he paints, and at whatever time of day; and except one or two sunsets (rather crude), he seems practically to have only one effect. It is a very good one, but—*toujours perdrix*. Some small drawings by Mr. Chas. Robertson, of coast scenery, in the same room, are worth attention. In some of them Mr. Robertson seems to have been emulating the style of small finished water-colours, pictures in miniature, which Turner did for engraving.

WE regret to hear that Mr. G. H. Birch, who designed and superintended the erection of the old London Street which has unquestionably been the central attraction to an immense number of those who have visited the Health Exhibition, has had but a very meagre recompense for his labours, having had to pay out of his own pocket the clerk of works' salary and other incidental expenses, amounting to more than 25 per cent. out of a fee somewhat inadequate to begin with. Surely the committee for carrying out the work should have been aware that the clerk of works' salary, at least, is always paid by the building owner, not by the architect. Mr. Birch has further had the pleasure of seeing an illustrated guide to the "street" brought out by a large publishing firm, without any consultation with him, swarming with mistakes and describing houses that are not in the street at all. Mr. Birch has every right to feel proud of his work, which has given pleasure and interest to many thousands of people, but, apparently, virtue is mainly its own reward in this case.

MR. DOBBS, the champion of the consumer against the water companies, has published an audited statement of accounts of the money subscribed by public bodies and private individuals to arm this modern St. George for his conflict with the dragon. The costs have been somewhat heavy, but, says Mr. Dobbs, "Bearing in mind that not only the annual income, but the capitalised amount to be paid under any compensation, is affected by the case; and considering that this has been accomplished by an expenditure of less than 800*l*., I think the result will be satisfactory to London; and I may look back on my three years' work and anxiety without regret." Mr. Dobbs proceeds to draw attention to the still unsatisfactory state of several matters connected with the metropolitan water supply, such as the increased charges lately made for water rate on business premises, the want of any decision of the Courts of Law as to the proper method of supply to such premises, the state of the law as to charges for stable and coach-house supply, the regulations as to fittings for constant supply, and, of greatest importance, the unregulated power of cutting off supply as the readiest means of compelling acquiescence in doubtful claims.

AMONG stray exhibits at the Health Exhibition which deserve mention is a model showing "Quayle's Patent" for a new way of connecting guard-bars with window-sashes, the bars being attached to the under-side of the bottom bar of the sash and rising through the sill when the sash is raised. A simple means of disconnecting the bars at pleasure is provided, but this can also be locked by a key working in the sash bar, so as to prevent any but the master hand from disconnecting them. This provision for the security afforded by bars, without their unsightly appearance as a permanent screen to the exterior of the window, ought to be very useful in such buildings as lunatic asylums and hospitals, and also in the nurseries of private houses.

FROM a Melbourne paper we notice that an interesting lecture was given before the Adelaide Chamber of Commerce, by Mr. T. W. Chambers, hon. secretary to the River Darling Navigation Company, on making the Darling navigable all the year round, and that a committee had been formed to co-operate with that company in their endeavour to carry out the project. It appears that the New South Wales Government is desirous of diverting the trade of the district of Riverina from Melbourne and Adelaide to Sydney, whereas its natural outlet is by the rivers Darling and Murray; but owing to an insufficiency of water, the former is often closed for more than six months in the year. It seems that though this state of things has repeatedly been brought to their notice, the New South Wales Government refuse to apply any remedy. Mr. Gordon, "the well-known Victorian hydraulic engineer," reported that it would be possible to lock the Darling from Wentworth to Wilcannia, so as to make it permanently navigable, for 310,000*l*., and that the annual cost of maintenance would be only 7,250*l*. The scheme, if carried out, will yield, it is estimated, a return to the shareholders of 8 per cent., and be of immense advantage alike to Riverina, Victoria, and South Australia.

PREVIOUSLY to 1829 the angle formed by the north transept and choir at St. Giles's Cathedral, Edinburgh, was occupied by a building of several stories, having a domestic aspect, and which may have been the residence of the sacristan. In order to make this building correspond in outward appearance with the chapel of St. Eloie, which occupies a similar position to the west of the transept, Mr. Burn caused large three-light traceried windows to be inserted in the outward walls to the north and east, although internally there was only a room of about 11 ft. square cut off from the choir by a solid wall. This room was

fitted with a flat plaster roof, and was used as the vestry up to the time of the restoration undertaken by the late Dr. William Chambers. The architect of the restoration, Mr. W. Hay, proposes to open up this chamber towards the choir by forming a boldly moulded arch, stripping off the lath and plaster from the walls and substituting a stone groined roof for the plaster one. The walls would be faced with stone, the floor paved with marble and screened off by a wrought-iron railing similar to those of the other chapels. It was suggested that the chapel thus formed should serve as a memorial of and be occupied by a recumbent figure of the restorer. Instead of the effigy the Lord Provost's Committee have expressed a preference for filling the windows of the chapel with stained glass, but this it is thought might be left to private donors, who, as experience has shown, are ready to undertake this part of the work.

THE "Union Centrale des Arts Décoratifs" continues with varying success its course of meetings and lectures. After M. Baudot on ceramic art, followed M. Appert on glass-work, and M. Ph. Burty with another critique on ceramic art, but on that of Japan and the far East more particularly. A lecture by M. Paul Sédille on contemporary architecture in France and the rest of Europe is expected to be given shortly.

THE annual public meeting of the "Académie des Beaux-Arts," in Paris, which took place last Saturday, went off with more than usual *éclat*. The musical performances, consisting of an "Ouverture Symphonique," composed by M. Broutin, a "pensionnaire" student at Rome, and a "scene lyrique" by M. Debussy, the holder of the first "Grand Prix" for musical composition, are spoken of as exhibiting qualities beyond those of students' compositions generally. In the discourse of the President, M. Guillaume, the unity and relationship of the arts seem to have been especially recognised in a passage which is in other respects sufficiently suggestive for quotation :—"Le point essentiel est toujours de savoir si ce que l'on peint, si ce que l'on sculpte, si ce que l'on chante est l'exacte expression de ce qu'il y a de plus profond dans le sentiment, si l'on ne sacrifie rien de cette vision, invisible à tout autre, que l'on porte en soi, si on ne lui donne pas une forme mensongère, si l'on ne se trahit pas. Cas de conscience perpétuel, dirai-je, travail d'honneur que l'artiste doit faire sur lui-même, et qui, dans l'élaboration mystérieuse de son œuvre, est le seul dont il ait le secret."

THE Metropolitan Board, at their meeting on Friday last, declined to grant a certificate under the Metropolis Management and Building Act (Amendment) Act, 1878, in respect of the large concert-room (to be called Connaught Hall), at the west end of the Albert Exhibition Building, Prince of Wales's-road, Battersea Park, on the ground that the building does not comply with the Board's regulations with regard to places of public entertainment. The building in question has, however, been licensed by the Surrey magistrates apparently without waiting for the Board's certificate.

THE Joint Committee of the Metropolitan and Metropolitan District Railways have sent us a formal announcement that in consequence of numerous suggestions they have altered the name of "Eastcheap" Station on their new length of line to "Monument Station." One name seems to us as good as the other for practical purposes, and "Eastcheap" goes much further back in the history of London than "Monument." It would be more to the purpose if the directors would direct their minds to the "numerous suggestions" they have received as to the necessity of accelerating the traffic on the line. That we should arrive at a station in decent time is of more importance to most of us than what name we shall find it called by when we do arrive.

NEW LIGHT ON THE HERMES OF PRAXITELES.

THE German excavations at Olympia are long since closed. It is scarcely possible that the deserted plain will give up a new statue by Praxiteles, or even a fresh fragment of a pediment by Pæonios. But when the actual discoverer,—the excavator,—ceases from his labour a new work sets in scarcely second in importance. Discovery is over, interpretation begins. Only a few can discover, the field of interpretation is open to all. The mass of material remains the same, but from time to time this or that monument is lighted up with fresh light,—an unexpected link binds the known to the unknown,—an unmeaning, isolated detail wins by a right juxtaposition its right significance. Dr. Purgold, in his "Olympische Weihgeschenke," has made no new discovery; but, in a wonderfully ingenious way, he has seen the meaning and relation of two or three old ones, and by so doing has incidentally given us a more secure foothold for dating the famous Hermes of Praxiteles. His ingenuity, though equally great, might have won him less applause had it involved any statue less widely popular.

We all know where the statue was found, and what Pausanias said of its surroundings when he noted it in the Heraion. In this ancient sanctuary, "more museum than temple," as it has been happily called, his admiration was aroused by the great number and beauty of the archaic works of art there gathered together, the old chest of Cypselus and a host of other curious works in gold and ivory. But, as he passed out of the Heraion, he noted three other works standing within the cella, works which *had been added later*. These were the well-known Hermes and an Aphrodite by Kleon; and, further, in front of the Aphrodite, the statue of a naked boy gilt over, which, Pausanias adds, was the work of Boëthos of Carthage. The Aphrodite we may dismiss, only noting that it was the work of Kleon. We know that he made another statue for an Olympian shrine about 384 B.C., so that he may quite naturally have been still at work about 360 B.C., the date we shall seek to establish.

It is on this other statue of the naked golden child or babe *παιδίον* that Dr. Purgold has expended his ingenuity. It has puzzled archæologists a good deal. The fact that Pausanias leaves it unnamed and unexplained has led many to suppose that it was a mere *genre* composition of no mythological significance, and, relying on this theory, Dr. Overbeck has sought to identify it with the famous Capitoline "Boy extracting the Thorn." But Dr. Purgold has something better to offer us. He starts naturally from the assumption that a statue, occupying an important place in a shrine so important as the Heraion, would have some well-defined and weighty significance. He happily recalls that in a terrible crisis of the affairs of Olympia a very significant part was once played by a naked child. Pausanias himself tells the story (vi. 20, 4 and 5). But he tells it not *apropos* of the child in the Heraion, but when describing the sanctuary of Sosipolis (saviour of the State). The Eleans, the proper owners and defenders of the Olympian plain and its sacred games, were hard pressed by the Arcadians; the boy Sosipolis was as yet a child at his mother's breast, and the mother dreamed that the child should save the Elean host. They placed the child naked in front of their battle array, and as the Arcadians came up, the child was changed into a snake, and, panic-stricken at the omen, the Arcadians broke and fled. The Eleans consecrated a shrine in their capital to their deliverer, Sosipolis, building it near to the temple of the goddess Tyche (Fortune). In the shrine was a *picture* of Sosipolis,—he was represented as a child dressed in a chlamys, spotted with stars (no doubt to indicate the metamorphosis into a snake), and in one hand he held the horn of Amaltheia. Another picture of him was exhibited on the actual spot where he was said to have appeared.

No record is left us of a statue of the saviour-child, and yet what more probable, what more almost certain, than that such a statue existed. And if it did exist, what place more likely for its exhibition than the Heraion? The shrine proper of Sosipolis was only accessible to the priestess. It stood on the Kronion-hill, at the foot of which lay the Heraion, ready to hand for a commemorative statue.

The question of the identification of this child statue by Boëthos with Sosipolis is in itself of great interest, but it gains double interest from the fact that it forms one of the group of statues "added later," to which the famous Hermes belongs. If we can date this Boëthos statue, and if it be Sosipolis, it follows that we can date the Hermes.

But supposing we grant that the child statue represents Sosipolis, how do we securely date it? When by the help of the child Sosipolis, the Arcadian host was driven back, the Eleans in their gratitude dedicated not only the shrine we have mentioned, but also a colossal bronze statue of Zeus himself, the largest that the sacred altis contained. Its height was 70 ft. The statue has, need we say, perished; but near the east front of the Temple of Zeus, on the north side, a fragment of a huge bathron, or statue basis, has been found, the dimensions of which would suit just such a colossal statue, and happily the inscription remains in part. "Of the Eleans, concerning their treaty (*ὁμονοίαρ*)." In this inscription the retention of the digamma, and the irregular characteristic form of the letters, specially the N, lead epigraphists to date it as not later than the first half of the fourth century B.C. It is just at this time that the event falls to which almost without doubt the inscription refers, *i.e.*, the Arcadian invasion. The terms of the inscription are peculiar, and can scarcely refer to any other event; the colossal bronze statue was not an anathema of the ordinary sort, not made out of the spoils of a conquered foe, but it was *περὶ ὁμονοίαρ*, concerning a union or treaty only temporarily disturbed. The Arcadians themselves felt that the struggle was an impious one,—religious scruples led to dissension in their camp. The sacred festivals could only prosper when conducted by the chosen tribe of the Eleans. Accordingly, the war ended rather in treaty than defeat, and the bronze Zeus may have been even a joint offering to symbolise unity restored.

Gathering together, then, the scattered threads of our evidence, we shall not be far wrong if we closely associate together the little group of statues added later, which Pausanias saw in the Heraion, and add to them the inscribed basis of the Zeus colossus. About 360 B.C. occurred the Arcadian disaster. The invasion had devastated a great part of the altis, and from the position of the memorial temple we may suppose that the Heraion suffered exceptionally. Architecturally, it is plain enough that before the statue of the Hermes was set up the building had undergone restoration, the cella had been rebuilt, and the statues *added later*, *i.e.*, the Aphrodite, the Sosipolis, and the Hermes, are placed with a view to the new restoration. Immediately after the repulse of the Arcadians we may then picture to ourselves an energetic restoration of the devastated altis and an eager dedication of new temples and statues. The Heraion is rebuilt, and in the restored building is placed the Aphrodite, possibly a successor of some destroyed statue; the Sosipolis, in honour of the saviour of the State; and the Hermes, carrying the child Dionysos. Dionysos was a child held in special reverence by the victorious Eleans,—his childhood was thus represented in the Heraion, while by the same artist Praxiteles, and, probably, in honour of the same victory, there was set up at Elis a statue of Dionysos full-grown. It seems possible, though Dr. Purgold does not suggest this, that the *infant* Dionysos in the Heraion may have been suggested by the *infant* Sosipolis.

Not only was the old Heraion restored, but the new shrines to Sosipolis and Tyche were built, and possibly to the same date belongs the Metroon.

Such a period of restoration, religious enthusiasm, and artistic activity would well accord with the political unity and strength brought about by the Theban supremacy. Anyhow it gives to a statue which has hitherto stood somewhat solitary in its fame, a background and a fitness of circumstance which, once conjectured, we should be loth to forego. It also accords well with Professor Brunn's view that the Hermes belongs to an early period of the activity of Praxiteles.

Dr. Purgold's ingenious essay forms a very fitting part of the birth-day volume dedicated to the great Olympian discoverer, Professor Ernst Curtius, on his seventieth birthday,—a work we may notice on another occasion.

LONDON WATER SUPPLY.

The fourth annual statement* by Mr. Alfred Lass, comprising an analysis of the accounts of the Metropolitan Water Companies has just been published, and will, no doubt, be scanned with interest by not only those who are interested in their welfare, but by many who feel that the prosperity of the companies is obtained at the expense of their customers. As it may not be in the power, however, and still less in the inclination of many to pay 15s. for a copy of the statement, we propose making a short abstract of the principal facts and figures recorded in it. The public generally are little aware of the enormous duty which the several water companies have to perform in order to supply the wants of the metropolis. During the past year 654,102 houses have been furnished with an average of 226 gallons daily, and a population of 4,913,513 persons have received 30·31 gallons each per day, the supply varying from 42 gallons by the Chelsea works to 26·11 gallons in the West Middlesex district, inclusive of all purposes, while the consumption per head for domestic purposes only has ranged from 30·41 gallons in Chelsea to 20·89 gallons in the Middlesex district, giving an average of 24·25 gallons. Of the 654,102 houses 237,826, or a little over one-third only, are furnished with a constant supply, notwithstanding that during the year 35,383 houses have received that boon; but, as during the same period 20,688 additional houses have had to be supplied with water, it must necessarily take some time before the constant supply can be made general. The aggregate quantity of water contributed throughout the twelve months by the several companies amounts to the enormous volume of nearly 53,000 million gallons.

The finance of the companies stands as follows:—Of the total authorised capital of 14,483,774*l.*, nearly 13,297,000*l.* have been raised, leaving a balance of 1,375,328*l.* yet to be called up. The total sum expended amounts to 13,317,582*l.*, giving as the capital cost for the supply of 1,000,000 gallons 248·52*l.*, or nearly 5s. per 1,000 gallons.

The gross income is comprised of receipts under the two main heads of water-rates and miscellaneous items, the first of which amounts, after allowing for empty houses and bad debts, to over 1,611,000*l.*, yielding a rate of from 9·84 pence in the New River system to 4·48 pence in the East London works, and an average rate of 7·21 pence per 1,000 gallons, or 12 per cent. on the capital outlay. The cost of maintenance, inclusive of all items, is stated to be 2·05 pence per 1,000 gallons, or 28·19 per cent. of the gross income; but of this 8·36 pence are on account of pumping and filtration, which are scarcely items of maintenance, as that is a term more generally implying the outlay necessary for an effective upkeep of the various parts of a system together with the cost of supervision. The maintenance of the reservoirs and mains amounts to 5·17 per cent. of the gross income, and the salaries of engineers, &c., to 3·36, rates and taxes to 7·41, while the balance is made up of miscellaneous charges. To these expenses has to be added the cost of management, which includes the fees to directors, auditors, secretaries, and other officials, to collectors, the general establishment, and law and Parliamentary charges, the total amounting to 123,522*l.*, or 7·60 per cent. of the gross income. The combined expenses of maintenance and management reach the large total of 581,708*l.*, and form a charge of 35·79 on the gross income, thus leaving a sum, inclusive of a few other sundry items, of 1,049,438*l.* as "gross profit." From this latter sum has to be deducted interest on loan capital, Debenture and Preference Stocks, amounting to 151,481*l.*, leaving a net profit of 897,957*l.*, equal to 4d. per 1,000 gallons, and yielding an average dividend of 9·35 per cent. on the stock and share capital. The West Middlesex and New River Works produce the highest dividend, viz., 11·50 and 11·29 per cent., while the Chelsea Works yield only 7·24. The net profit per 1,000 gallons is greatest in the New River and Kent Companies, being over 5d., while that on the East London and Southwark and Vauxhall is less than half that sum. The rates charged by the same companies are 10·64d., and 7·64d. in the one case, and 4·6d. and 6·5d. in the other. These figures tend to show the inequality in the rating, while the great excess of profits accruing to the companies which charge the higher rates shows that such rates are not necessarily called for by any increase of first cost or subsequent maintenance. The prices charged are unquestionably much higher than should be levied for such an absolute necessary of life, but, until the question of water supply is taken up and dealt with as a whole by some central authority, the public must continue to suffer from the loose legislation which placed such great powers in the hands of the metropolitan companies, from whose exactions not even the judgment delivered in the Dobbs case seems likely to afford much relief. The preparation of the statistics contained in Mr. Lass's pamphlet must have involved a vast amount of time and labour, but it is to be regretted that its price has been pitched so high; for it cannot but limit the sale considerably amongst a numerous class of householders to whom the information it contains would be very acceptable.

* Analysis of the Accounts of the Metropolitan Water Companies, 1883-84. By Alfred Lass, F.C.A. London: Walter King.

STOVES, GRATES, AND GAS STOVES AT THE HEALTH EXHIBITION.

We this week conclude our notice of the contents of the East Arcade, but, before referring to the exhibits of firms which have not yet been mentioned, we revert for a moment to our former notice (p. 487, *ante*), in which we inadvertently omitted to call attention to a grate shown by the Coalbrookdale Company which, in the opinion of some architects who have seen it, possesses qualities that are likely to secure for it a foremost place among the best types of ventilating grates. It is claimed for it that without infringing any patent it is so constructed as to combine all the advantages of the best-known grates, including the "slow-combustion,"—*minus* the "fire smothered in its own ashes." This grate is named "Crane's improved ventilating grate."

Stand 619 is occupied by Messrs. Smith & Co., of Osborne Works, Blackheath, who exhibit a kitchener, the "Blackheath," which possesses some good points.

Gas cooking and heating stoves are shown in great variety and abundance, and in many of them marked improvements are visible. The great convenience and cleanliness of most of these appliances will, without doubt, as time goes on, do much to make their adoption general for at least a portion of the year. In them the supporters of the smoke-abatement movement will find much help in the crusade against soot and dirt. Among the exhibitors of gas stoves are Messrs. John Wright & Co., of Birmingham (Stand 620), who show their "Eureka" gas cooker, which is very conveniently arranged. By lining the interior with a non-conducting substance, the consumption of gas is diminished, it is asserted, by as much as 40 per cent.

Stand 621 is occupied by Mr. J. B. Petter, of Yeovil, with his very ingenious "Nautilus" grate, which has now been before the public for some time, and has met with much approval. In cross-section the grate,—which gives a pleasant open fire,—resembles a nautilus shell. In summer the grate may be lifted out and the fireplace recess filled with plants and flowers.

Mr. Edward Bingham (Stand 622) exhibits dog-grates, slow-combustion stoves, and ventilating and warm-air chamber stoves.

At Stand 623 Messrs. Fredk. Edwards & Son, of Great Marlborough-street, exhibit their "Economic" slow-combustion tiled kitchener, with loose ash-plate for stopping the supply of air to the under-grating, and with plate to close in front of the fire, so that the fire could be kept in continuously if required. The same firm also show their improved slow-combustion and smoke-abatement grates.

Mr. T. J. Constantine, of Fleet-street (Stand 624), shows his "Treasure" ranges, and utensils used in connexion therewith.

At Stand 627, Messrs. Benham & Sons, of Wigmore-street, show (besides their ventilating globe-light as improved for use in hospitals), the "Wigmore" range, Edwards's smokeless grate, and Benham's ventilating kitchener.

Messrs. H. & C. Davis & Co., of Camberwell (Stand 628), are exhibitors of a very good gas cooking-stove, the "Metropolitan," which appears to be both convenient and economical. The same firm are exhibitors of the patent "Thermo-hygienic" heating and ventilating stoves, in which gas is the heating agent; the heat is utilised in the most economical manner, and the products of combustion cannot pass into the apartment to be warmed.

Mr. James Keith, of Arbroath (Stand 629), exhibits his "open-fire hot-water apparatus," and his patent sectional "Challenge" boilers for hot-water heating. These boilers are constructed of sections placed one above another in such a manner as to give about ten times the heating surface of ordinary saddle boilers, and they are complete in themselves, requiring no brick setting, the fire being wholly "water-jacketted." The construction is very ingenious, and the arrangement and form of the sections are such as to ensure the minimum amount of fire to produce a given effect. An interesting exhibit at this stand is a model of the oil-gas apparatus which Mr. Keith is now erecting for Ailsa Craig Lighthouse, upon the recommendation of Messrs. D. & T. Stevenson, the engineers to the Commissioners of Northern Lighthouses.

At Stand 631 Messrs. Brown & Green, of Luton, exhibit a smoke-consuming kitchener burning common coal.

Messrs. Martineau & Smith, of Birmingham (Stand 632), exhibit some useful steam kettles or water-boilers, as used by the Birmingham Coffee-House Company. By the aid of one of these kettles, 20 gallons of water can be boiled in three minutes from the time the steam is admitted to the steam jacket.

At Stand 633, Messrs. W. & S. Deards, of Harlow, exhibit the "Princess Louise" open-fire coil-grate, in which the fire-bars form parts of coil-circuits which pass round the room. It appears to be well adapted for warming school-rooms, &c.

Messrs. Deane & Co., of King William-street (Stand 634), exhibit a variety of gas cooking and heating stoves, patented by Mr. Fletcher, of Warrington, with his "solid-flame" burners for boiling. These will repay examination, and the same may be said of the numerous workshop stoves made by Mr. Fletcher for use in various technical processes.

At Stand 636 Mr. John Bell, of Southwark-street, exhibits asbestos as applied in gas-stoves, &c.; he also shows an asbestos fire-proof plaster.

Mr. William Hellier (Stand 637) exhibits a "water-heater," as well as a simple arrangement for heating conservatories, greenhouses, &c., by gas or oil fuel, without the possibility of the fumes of the gas or oil escaping into the apartment to be warmed.

Stand 638 is occupied by Jaffrey's Patent Grate Company, of Charing-cross. The grate which they exhibit is constructed to burn ordinary coal, and has an arrangement for consuming its own smoke. The fire produced by it is very bright and cheerful, and radiates a considerable amount of heat, while it is economical in its consumption of fuel. It will burn either bituminous coal or anthracite.

At Stand 651, Messrs. Wm. Sugg & Co., Limited, show their "Charing-cross" Gas Kitchener,—a convenient apparatus combining facilities for roasting, boiling, frying, grilling, and baking.

Messrs. Davis & Sons, of Bath (Stand 653), exhibit some well-made gas cooking stoves.

Dr. W. H. Stephenson, of Blackburn (Stand 654), exhibits his portable gas-heating water coils, which are constructed of a series of double copper tubes, 4¾ in. in diameter, placed one above the other, and connected at each end. An ingenious automatic heat-regulator is shown in action by the same exhibitor.

At Stand 655 Messrs. Pugh Brothers, of Highbury, show a new gas-fire fitted with prepared asbestos fuel.

Mr. R. E. Cox, architect, of High Holborn (Stand 656), exhibits his patented improvements in grates. These improvements are well worthy of notice, for it is claimed that in virtue of them an ordinary grate can be converted into a smokeless slow combustion stove at little expense. We have not space to describe them in detail, but we may say that they are shown applied to a common register stove, so that if Mr. Cox's invention be all that Professor Ayrton's report upon it would seem to indicate, there is hope of obtaining efficiency and economy in our domestic fireplaces.

Mr. H. H. Hazard (Stand 657), of Knightsbridge, exhibits some gas cooking stoves of novel arrangement, patented by M. Chabrier, of Paris. One of these stoves is specially designed to be placed on the top of a disused coal-burning kitchener during the summer months. All these stoves appear to possess considerable merit, the roasting and broiling burners giving

a bright radiating flame, whilst the burners for boiling (which are on the atmospheric principle) exhibit novelty of arrangement and construction, whereby they can be instantaneously taken out and washed.

At Stand 660 Messrs. Edward Davis & Son, of York-street, Westminster, exhibit some gas-cooking stoves which have their ovens lined with white tiles.

Messrs. Charles Wilson & Sons, of Leeds (Stand 661) exhibit gas-cooking and heating stoves, bath-heaters, and a new patent gas-fire.

Mr. J. G. Wagstaff, of Dukinfield (Stand 662), shows some patent saddle and cylindrical boilers, coils, coil-cases, &c.

Messrs. Musgrave & Co., of Belfast (Stand 663), exhibit one of their admirable slow-combustion ventilating double-chambered stoves, which will burn for several hours without attention. The fireplace is lined with fire-clay, and holds sufficient fuel to last for from eight to twenty-four hours. It is fed through a door on the top or front, and there is another door in front which admits the air for combustion, and allows the ashes to be removed. It is also provided with a hot-air chamber, through which the cool air of the apartment passes. This stove, if placed in the hall, will keep up a supply of warmed fresh air for the whole house.

Mr. Alfred Churchman, of Fulham (Stand 665), exhibits a new asbestos gas fire stove, with a special arrangement for regulating the amount of heat.

Messrs. J. Nettleton & Co. (Stand 666), of Sloane-square, exhibit their patent open and close fire heating-stoves, constructed with a view to supply warm fresh air to buildings. It is claimed that by the use of these stoves the warm air supplied is unburnt. The stoves will burn for from six to nine hours without attention.

At Stand 670, Messrs. Geo. Wright & Co., of Queen Victoria-street, exhibit Dyer's patent front fire-bars for domestic stoves. The improvement consists in arranging the bars louvre-fashion, the lower edges of the bars being towards the fire, so that the bars slope upwards and outwards. It is claimed for them that by their use fireguards are rendered unnecessary, that cinders and dust cannot fall out in front, and that the radiation of the heat of the fire is much improved.

The Eagle Range Company (Stand 671), of Regent-street, show their speciality, which has been mentioned by us on previous occasions.

Messrs. Beynon & Cox, of Torquay (Stand 672), exhibit gas-cooking stoves so arranged as to prevent the fumes of the gas from coming in connexion with the food placed in them.

At Stand 674 Messrs. Adams & Son, of the Haymarket, exhibit Captain Warren's patent cooking apparatus, as adopted by H.M. War Department.

Mr. D. O. Boyd (Stand 678), of Maddox-street, shows his patent Hygiastic "Fisheries" grate, so named, we presume, because it was used at the "Fisheries" Exhibition. It affords an admirable means of warming and ventilating hospitals, schools, and all large rooms requiring an abundant supply of warmed fresh air.

Messrs. Hearder & Son, of Plymouth (Stand 679), exhibit a slow-combustion improved Arnott stove.

Mr. Henry Masters, architect, Bristol (Stand 681), exhibits a method of heating by gas tubular condensing and evaporating apparatus. The apparatus consists of two hollow pedestals connected together by twenty horizontal tubes, all made of sheet metal, and it is so arranged that the products from two gas-burners, one at the base of each pedestal, shall circulate through the pedestal and the whole of the tubes, backward, then forward, and then pass out of an aperture or chimney. The distance travelled by the gas in this apparatus is about 15 ft., and the heating surface about 40 ft. The inventor says that, in his experience, he has found that if the products of burned gas be made to pass through a horizontal tube 16 ft. long, the quantity of moisture deposited upon the inside of such tube at its end checks the flow of the gas products,—so much so that it becomes nearly stagnant, and the difficulty of carrying off the fumes by a flue or pipe is retarded. He therefore allows the products in his apparatus to be checked at about 14 ft. by striking against a plate, which he names a condenser; the moisture is here partly collected and passes through tubes which convey it to evaporating troughs,—one over each burner, and it is dried up and leaves a deposit in the troughs which may be cleared out readily.

At Stand 683 Mr. Harry Hunt, of Newington Green, exhibits the "Crown Jewel" stove and the "Hygiene" ventilating hall stove. They are both American productions, the latter being an improvement upon the former. The stoves are made to burn coke or any kind of smokeless fuel, anthracite in particular. The "Hygiene" stove can be left without attention for twenty hours. The same firm are exhibitors of what are called "the patent gas-fumes neutraliser stoves,"—a very awkward name,—in which it is sought to neutralise the fumes or products of combustion by means of layers of silicated cotton and carbon. It is claimed for them that as no flue is required the whole of the heat generated is utilised. A cooking-stove on this principle, which is shown, consists of two separate parts, the top or hob, and the oven, either of which can be used independently.

In conclusion, we would only refer to the unsatisfactory lighting of this important section of the exhibition by night.

THE PLUMBERS' CONGRESS.

This Congress was opened on Monday at the Technical Institute, South Kensington, under the presidency of Mr. George Shaw, Master of the Plumbers' Company. There was a very large attendance.

The Chairman, in commencing the proceedings, recapitulated what he had said at the preliminary meeting at the Guildhall (reported in the *Builder* three weeks ago, p. 472). He referred to the old ordinance of Edward III, which nearly covered the whole of the subjects they were to discuss, and said that they should endeavour to discover means by which the public would be protected from the serious evils arising from defective plumbing, by enforcing personal responsibility against those doing bad work. This could only practically be done by establishing a standard of excellence in work and material. He hoped their deliberations would tend in this direction. The Court of the Plumbers' Company were fully disposed to take action in the matter; and it was satisfactory to find that at last such a general movement was taking place.

Mr. Ernest Hart read a paper in support of the extension of the existing statute law as to house drainage in order to provide for the more efficient regulation and registration of plumbers. He referred to the carelessness of householders generally with the question of drainage until the matter was brought home to them by the occurrence of disease in their houses; and he pointed out that many cases of ill-health short of actual disease had their origin in the exhalation of sewer gas. After summarising the existing laws on the subject, he quoted Mr. Rogers Field's statement that he had only found three sound drains in the course of his eight or ten years' experience, and the figures recently announced by the London Sanitary Protection Association, as proofs that as a matter of fact the number of houses that could be regarded as safe from the irruption of sewer-air was very small indeed. Our public buildings did not set a good example in this respect, for one of the most flagrant cases of bad drainage ever seen had been observed at the office of the Local Government Board, the chief sanitary authority in the kingdom. He thought that much might be done by encouraging lectures to plumbers on the plan recently adopted by the National Health Society, and by affording opportunities for the systematic instruction of plumbers in their craft through the Plumbers' Company, or in some other authoritative way. His suggestions as to legislation were, that the powers of rural and urban authorities should be assimilated; that the principles of the Model By-laws as to new streets and buildings should be embodied in a Building Act to have universal application. All drainage works should be executed in accordance with plans and specifications previously approved by the local authority. No drainage works should be covered up until passed by the surveyor, and all drains should be tested before being passed. No new house should be allowed to be inhabited before being passed and certified by the surveyor. All plumbers should be registered and licensed, no work being allowed to be done by unlicensed plumbers, and no licence to be given except after examination. The licences should be renewed from year to year, and a list of licensed plumbers published annually. The reasonableness of these regulations he supported by what was being done in the chief American cities.

The first subject for discussion was "The Technical Instruction of Plumbers." On this subject,

Mr. W. Eassie, C.E., read a paper in which he contended that plumbers were often to blame for having fallen from the high position which the craft occupied in ancient times. The healthy conservatism of the trade had degenerated into unhealthy radicalism. Mere manual skill was not sufficient to make a finished workman, and he would not honour with the name of technical education the mere use of tools. It was to be regretted that the bulk of the literature of the trade had been of too elementary a character. In his opinion a technical knowledge of plumbing should consist not simply of using certain metals for certain purposes, but of a knowledge why they were so used. It should consist of being able to apportion the metals in case the plumber found himself in a new colony; of being able to sketch in minute detail any appliances; and of not only being able to execute work, but also to measure it up. There should also be sufficient knowledge to tell whether work would fail if carried out in the manner directed, and to provide a remedy. Architects and clerks of works were sometimes to blame in dealing with plumbing work, and showed a total lack of technical knowledge. The inexperienced architect specified that a soil pipe should be fixed inside the house, when it was usually to be found outside; the clerk of works passed it; the builder erected it; the surveyor measured it up; and yet the arrangements betokened a lack of the necessary knowledge. So things would continue until the status of the trade was raised, and until the plumber reached a stage which would enable him to become a teacher of his craft, and to refuse any ill-conceived work. The manual education of the plumber would be secured during his apprenticeship, and much practical work learned besides, but there was a great want of technical education, and the question was how this could best be imparted. It must be derived more or less from books. The mere seeing and handling of lead would not teach all its properties and applications, any more than a knowledge of the bones taught the practice of surgery,—hence the institution of the City and Guilds Institute, and of the various technical schools. There should be not only a written but an oral examination, besides a practical demonstration of the capabilities of the metals. He would be inclined to follow more or less closely the system adopted by the National Health Society in the plumbing competition inaugurated by Mr. Shaw; and would accord no medal in the first year to any but those who passed the ordeal with commendable credit. It would repay the candidate for coming a long distance to receive such a medal, as it would place his thorough competency beyond cavil.

Mr. C. T. Millis (of the Technical College, Finsbury) read a paper on the same subject, in which he urged that the instruction requisite for the plumber of the future should be divided into the following heads:—Mechanical drawing for the trade; practical work of the trade; and physics of the trade. Under the first head he would place practical geometry appertaining to the trade, including pattern-cutting, or the development of surfaces, and the making of working drawings from dimensioned rough sketches, to be done by the student from models of plumbing appliances and fittings. The second head included the manipulation of sheet-lead, elementary sheet metal work, and instruction in the various kinds of joints; while the third head comprised instruction in the physics of the trade, with laboratory work, by the aid of lectures and experiments. This latter would include the properties of metals and alloys, the composition of solder and the like, and the action of air and heat on molten metals. It was not to be expected that men who had reached middle age, or who had family or other ties, would take up the course of instruction put forward by him as needful for the plumber of the future. By the very words "of the future," young men were necessarily indicated, and it would be no heavy call on a young man to attend a course of instruction spread over (say) two years. When this was done, a plumber

would be as much trusted and praised as he had been abused of late years.

Mr. J. W. Clarke, a teacher of plumbers' work under the City and Guilds Institute, read a paper in which he contended that the meaning of technical education was not clearly understood by the London plumbers. No man could learn a trade by reading books or attending lectures. Technical education, as commonly understood, was not practical experience, and would never take its place. At the same time it was often asked, what was the good of a knowledge of technology? It might as well be asked, what was the good of brains? The plumber who knew something of the nature of the metals he used would take the precaution of protecting the public from injurious contact with noxious matters, and would know what should be used for each special purpose. A knowledge of hydraulics and hydrostatics, however elementary, was of great help to the plumber. He had never known an architect who gave detailed drawings for the plumber to work to, and the remedy for this was that the plumber should educate himself so that the architect would have confidence to advise with him personally. The plumber should know how to make drawings so as to be able to submit them to those in authority. It was necessary also that he should educate himself to prevent his being pushed aside by the sanitary engineers. The best solution of the problem was the establishment of trade scholarships. Through the munificence of the rich City Companies, schools could be opened in any place where a few plumbers were got together; but the plumbers themselves had not taken up the subject as they might.

Mr. E. G. Mawbey (Borough Surveyor of King's Lynn), in a paper read by him, stated that it was frequently found more difficult to convince the plumber than the owner of the necessity for modern sanitary arrangements. Plumbers, instead of opposing, should, in their own interests as well as for the benefit of the public, support the suggestions of experienced surveyors and sanitary inspectors. There was not so much difficulty in securing the technical education of plumbers in large cities and towns as in small towns and districts. This might, however, in the latter cases be effected to a great extent by holding plumbers' district meetings for the reading and discussion of papers, and the medical officers, local surveyors, and sanitary inspectors might be invited to take part therein, and the papers, &c., printed and circulated. The example of the Sanitary Institute might with advantage be followed by instituting examinations for plumbers and granting certificates to competent men.

In the discussion which followed,

Mr. Smeaton (London) maintained that the plumbers knew very well what they had to do. They had to get a living. A specification was put into their hands by a person who knew little about plumbing. The plumber was ordered to carry out his instructions and to mind his own business. The honest plumber was too often put on one side, and any one who could write on sanitary science came to the front. Competent plumbers only should be employed in connexion with technical instruction for the trade.

Mr. P. J. Davies (London) said that what was required was a number of duly registered instructors of the plumbers' trade. There should be an examiner in each district, and then there would be no difficulty in getting good plumbers. He was certain that members of the craft would never tolerate licences.

W. P. Buchan (Glasgow) contended that no man could learn the plumbing trade out of the shop. When a journeyman he had often to refuse to answer the questions of clerks of works, when under the master's order he had put on 5-lb. lead piping instead of 6 lb. lead. A knowledge of drawing lay at the root of the whole question of the education of the workmen.

Mr. Matkin was in favour of licensing plumbers.

Mr. Scott-Moncrieff (London) thought that the meeting should do something in the way of passing a resolution in favour of technical education. The day had nearly gone by when any plumber could take refuge under the failure of other tradesmen in connexion with the sanitation of a house.

Mr. Humphrey (Nottingham) considered that plumbers' work was not of the offensive character that should necessitate its being buried out of sight. The work should be open for inspection, and be thoroughly good work of its kind. The architect should be the ruling spirit in building work, but he should consult the men who had devoted their lives to particular branches of trade.

The chairman here suggested that some such resolution as the following should be passed:—

"That, in the opinion of this Congress, it is desirable that in future architects should not include plumbers' work in builders' contracts."

This was received with great applause, and was proposed by Mr. Clutterbuck, who said they had a right to protest against builders taking every kind of business in hand. Contracts should be divided, and so should the responsibility. The plumber would then receive 10 per cent. more for his work and the public be better served.

Mr. Firth (Kensington) seconded the resolution.

Mr. F. C. Penrose (architect) expressed his adherence to the separation of the plumbing work from builders' contracts.

Mr. Lane opposed the resolution, believing that divided responsibility would end in no responsibility.

Mr. Wandsborough contended that the action of the architects in including plumbers' quantities in building contracts had done more than anything to damage the trade. The architects would be serving the public better by conferring with practical men in their various spheres of work. If the work were divided it would open up facilities for the development of education, which masters at present could not afford to carry out.

The resolution was carried with one dissentient.

The next subject discussed was "Apprenticeship, the duration and condition of indentures suited to the present state of the plumbing trade, and to the modern system of technical instruction."

Mr. W. R. Maguire (Dublin) read a paper, in the course of which he said that the apprenticeship of plumbers should not be reduced to a shorter period than seven years, as of old time. The object should be not so much to induce apprentices to come in, as to insure that when they went out they should take with them a well-taught, well-learned, and well-practised handicraft for public benefit. Payment to apprentices should be formed more in accord with their value to their masters, than was now the case. Even if paid little in the first year there should be a tangible payment and steady advance of wages year by year. Employers being as different in character as workmen were, the Congress might frame some suggestions on the subject which would be accepted as a good guide by both employer and employed.

Mr. Frederick Fell (Worcester) followed with a paper on the same subject. Never in the history of the mechanical trades had so great a necessity existed for an apprenticeship of long duration and strict in its terms. Where the master confined his business strictly to plumbing, all that was needful might be learned in six years. He would like to see introduced into the indentures clauses compelling the apprentices to attend classes at properly-constituted Science and Technical Schools, and to pass at least two examinations during their term. The first of these should be simple and mainly practical, and the second one of a more searching character. No tradesman should be allowed to assume the responsible position of master, unless qualified to be one.

Mr. Smeaton in a paper contended that apprenticeship should be for at least five years, the most suitable time for which would be between the fifteenth and twentieth year. One or two evenings a week should be devoted to the study of the theory of plumbing, including drawing, geometry, water supply, heating, drainage, and the roofing of dwellings. The apprentice must be allowed, by mutual consent or arbitration, to have one master, and finish his term with another for the purpose of improving his knowledge of the trade. It would also be well if the indentures were endorsed as to the conduct and ability of the apprentice.

Mr. Scott-Moncrieff thought that five years would be a good period, with perhaps another two years as a term of probation in other workshops. He moved:—

"That, in the opinion of this Congress, it is desirable that the apprenticeship system should be continued, and modified, if necessary, to suit the improved course of technical education."

This was seconded by Mr. Stolder, and agreed to.

The third question discussed was, "The establishment of Metropolitan and Provincial Boards of Examiners of Plumbing Work."

Mr. P. J. Davies opened the subject with a paper, in which he advocated that a Metropolitan Board of Plumbers should be established, with head-quarters at the offices of the Plumbers' Company. The duty of the Board would be to examine plumbers both in theoretical and practical plumbing, and to grant to successful candidates a certificate and registration, which latter should qualify for the office of district examiner of sanitary plumbing work. If necessary, sub-committees should be established in large provincial towns to carry out the work in uniformity with the laws and regulations established by the Metropolitan Board of Plumbers, or by Parliament. The Committee should be made up of certificated plumbers.

Mr. E. Knight (Southwark) maintained that by the establishment of such boards, owners of houses would obtain certificates as to the proper sanitary condition of their dwellings. The advantage of this was manifest in connexion with the letting and selling of houses, and it would at once strike at the root of defective sanitation. The Board of Examiners should, if possible, be invested with some local authority, and should at all events hold a well-defined and acknowledged position. They would work in connexion with the parochial authorities, being careful at the same time not to usurp the duties of the inspector of nuisances. The charge for reports should be a small one. A board might be formed in the first instance from members of the Court of the Plumbers' Company, assisted perhaps by one or two professional gentlemen.

In the discussion which followed, Messrs. Moore, Underwood, and others took part. Dr. Vacher proposed:—

"That this Congress is of opinion that in the event of the establishment of Provincial Boards of Examiners of Plumbing work, such Boards (firstly) should be affiliated with a Metropolitan Board; (secondly) should consist chiefly of trained working plumbers; and (thirdly) should be in connexion with the provincial schools of plumbing."

Mr. A. B. Clarke seconded the resolution, which was carried.

The fourth subject was "The Registration of Journeymen Plumbers."

Mr. R. Smith (Bermondsey), who read a paper, was opposed to the proposed registration, as it would open up a field for many abuses, and ultimately do great harm to the trade. Any board of examiners would consist largely of members with theoretical qualifications, and such a class of judges would in time exclude the practical men. There were means in their midst for obtaining properly-qualified plumbers, viz., the trade societies. There was a prejudice against these, but he would ask what were the Plumbers' Company and the other guilds but trade societies? Plumbers were the only competent judges of plumbing, and the young man who joined a trade society had the benefit of the experience of the older workmen.

Mr. Smeaton advocated the granting of some such certificate as was given in America.

Mr. Houghton thought that if the masters were registered first it would have the effect of keeping linen-drapers and others from undertaking plumbing work.

The Chairman remarked that the registration would be a mark of high honour, showing that the person registered was a competent craftsman.

Mr. Swales said that in Melbourne plumbers had to pass an examination.

The Congress then rose for the day.

On re-assembling on Tuesday, again under the presidency of Mr. Shaw, the following resolution in continuation of the previous day's business, was passed:—

"That, in the opinion of this Congress, the registration of master plumbers and journeymen plumbers is expedient."

Mr. Webb read a paper on "The suitability of materials used in plumbing, and particularly of those materials recently introduced as substitutes for lead." There was, he said, no known substance to equal lead for wear. Properly laid, not condensed, well dripped, and with all the expansion possible, he contended it was the best. But they must adapt themselves to circumstances. In model dwelling-houses,

with drying-grounds at the top, it would be entirely out of place to use anything else but asphalte or cement and coke breeze. Turning to another substitute, viz., zinc, although much improved in the laying, it had no superiority over lead, being a hard metal without expansion, and liable to crack from the action of the acid in the process of soldering. With regard to cisterns he gave the preference to galvanised iron ones. In lead cisterns, and especially in certain districts, the action of water affected the weakest point of the cistern, viz., the outside of the soldering, and when the cistern was not frequently cleaned out small portions of the lead were liable to be imported into the system. Slate cisterns, as a substitute, would not stand the test; he had found in cleaning them out a slimy vegetable matter adhering to the sides, and there was a liability to leakage from vibration. With respect to soil-pipes he gave his allegiance to lead, and asked whether it was possible to make a caulked joint with iron lasting for any length of time? Shrinkage would occur in the cement of the joint, and the smell would exude. Turning to the question of closets, some good-looking pieces of porcelain had been introduced, but these were complicated in construction, and dirty from a sanitary point of view. He still adhered to the valve closet adopted by Bramah, but very much improved, for all private dwellings where supervision reigned. A very old servant, the pan-closet, had been harshly treated of late. Though long since condemned, it was still to a large extent in use, and would live as long as some of its contemporaries as a hard-wearing closet.

In the disussion which followed,

Mr. Davies said he considered the ordinary pan-closet was the filthiest thing in buildings.

Mr. Stolder affirmed that no cistern should be left for more than three months without cleaning.

Mr. Smith was not opposed to iron soil-pipes if they could be made sound. Iron and lead pipes did not always join well together; in a comparatively short time there was a crack in the joints, and the foul air would escape.

Mr. T. H. Court thought that plumbers should be allowed to use their discretion very much as to which was the best material to be used.

Mr. Underwood believed there was a great opportunity for plumbers to push lead as against zinc. For internal soil-pipes a good strong lead was the best, fitted neatly and well.

Dr. Vacher remarked that glazed earthenware was suitable for cisterns in country districts.

Mr. Smeaton was of opinion that lead was the most suitable material for soil or any other pipes, because good lead would stand the action of any amount of acids or air. He did not believe glazed earthenware used in water-closets or urinals would last more than twenty years. He had seen portions of the lead piping of the ancient conduit in Cheapside, and which was as good as on the day it was laid down. In the case of Glasgow, the engineer would not allow anything but lead to be used for the water-pipes, except for the large mains. He believed they all agreed that lead was the best material.

Mr. Buchan (Glasgow) read a paper on "The desirability of fixing upon a system by which uniformity in the quality of materials used in plumbing may be insured." In the course of it he said that the idea of enforcing uniformity in the materials used in plumbing was not new, as articles in connexion with the water supply of London and Glasgow had to bear an official stamp. No regulations, however, existed for roofing materials or soil-pipes. The practice of fixing thin cast-iron rain-water pipes inside houses, and especially to do duty as soil and waste-water pipes, should be prohibited. In many cases it was customary to discharge hot-water waste-pipes for baths and wash-basins into the soil-pipe for the closets. This was a bad plan, causing the soil-pipe to stink worse than with only cold water going through it. In addition to condemning thin iron pipes he objected to the way in which their joints were often made, viz., by merely plastering a little putty round the top of the joint. When the joints were not caulked and run with lead or sulphur, they should be rubbed with red lead, and the joints made with hemp dipped in red lead and twisted round the spigot end of the pipe. When in position the hemp should be rammed down and the joint run full with red lead.

In the discussion which followed, Mr. Coles remarked that a standard of the quality of materials should be fixed upon, to be specified in the tender.

An extra paper by Mr. Poole, of Norwood, on the same subject having been read,

Mr. Tidmas proposed,—

"That the Congress is of opinion that it is expedient that the system of sealing or marking lead and solder of standard weight and quality be revived by the Plumbers' Company, and that the Plumbers' Company should be requested to consider whether the materials used in plumbers' work as substitutes for lead are suitable, and whether standards of quality for such materials could be advantageously fixed on and verified by a recognised mark."

Mr. Smeaton seconded the resolution, which was carried.

Mr. F. Wells (Worcester) opened the question of "the formation of district associations of plumbers to investigate and secure, as far as practicable, correction of evils and abuses arising in connexion with the trade." If the formation of such associations would correct the evils of insanitary plumbing it would be a strong argument in their favour, and would effect a lasting good. Insanitary plumbing was the cause of a great amount of illness and death, and yet this sort of work was not only accepted, but sought after on the plea of cheapness. If district associations could be formed to correct these abuses, and carried on effectively, they would in the first place be the means of securing wholesome dwellings, and would give the honest tradesman his legitimate place in his trade.

Mr. Emptage (Margate) in a paper said that though much had been done through the labours of sanitarians and sanitary societies, it was small in comparison with what would be accomplished. Our American cousins had grappled ingeniously with the evils, and by the aid of a stringent plumbing law had almost regenerated the trade. In some places the law was carried out with great rigour, and he found that a plumber in New York was fined fifty dollars for putting in a dummy vent-pipe to a trap in the basement of a house; a master plumber was fined 150 dollars for allowing two dummy vent-pipes to be fixed; while another was fined 250 dollars for bad plumbing work in new buildings. An unregistered plumber lost the day in an action against a builder to recover his account for work done, because he was not registered, and was therefore working contrary to law. On the other hand, the permissive nature of our laws in regard to sanitary matters too frequently resulted in the presence upon our local boards of unscrupulous builders, and interested parties who used their position to silence the surveyor. The American law had been in force for more than three years, and seemed to work well. It protected the plumber to a great extent from dangerous competition, and enabled him to do honest work. There would be considerable difficulty in getting such a stringent law passed in England, but they might, with a good chance of ultimate success, aim at obtaining Parliamentary powers whereby all plumbing work in connexion with sanitation would be carried out under the strict supervision of properly appointed and duly qualified persons, upon certain fixed and sound sanitary principles.

Mr. John Bailey thought it would be better to form associations to remodel their craft, than to allow it to dwindle into mere tinkership. He would call attention to the fact that the general public when they had cause of complaint against the trade were not aware that the plumbers did not design their own work, but were in reality carrying out other people's ideas of sanitation. It was his opinion, after forty-five years' experience, that it was necessary to form metropolitan and provincial associations, not simply for themselves, but for the registration of journeymen plumbers.

Mr. T. H. Court, in a paper, referred to the necessity which existed for an investigation of plumbers' work. Architects in some instances, and the medical profession, were now giving more time and attention to the laws of sanitary science than at any previous period. He was sorry to say he had been compelled to condemn a large portion of the work he had seen in different parts of the country. They would all agree that there was the greatest necessity existing for a thorough investigation of plumbers' work, for the correction of evils and abuses. This should be done by associations formed for the purpose. It would tend to raise a trade which was second to none in importance, for upon the plumber's work more than upon that of any other trade did the health of the nation depend. The associations should be composed of plumbers, as the work to be inspected would be plumbers' work.

Mr. Allam (Eastbourne) proposed:—

"That the resolutions and conclusions set forth in the preceding paper be referred to the Plumbers' Guild, with a request that they will confer thereon, with a view to take such action as may seem best."

Mr. J. Murrell (Norwich) seconded the resolution, which was agreed to.

The Chairman, in summing up the work of the Congress, expressed the hope that it would result in the formation of a representative committee to carry out the recommendations and suggestions that had been made. He congratulated those who had attended the sittings on the practical character of the discussions and the genial manner in which they had been carried on, and thought it would only be the beginning of what would be an ultimate and general success.

A cordial vote of thanks to the chairman and to the Plumbers' Company closed the proceedings.

GLASGOW INSTITUTE OF ARCHITECTS

The annual general meeting of this Institute was held on Wednesday, Mr. Jas. Thomson, F.R.I.B.A., president, in the chair. Mr. William Maclean, the secretary, read the annual report of the council.

The report contained the following passages:

"The Committee (Mr. Sellars, convener) appointed to consider the Rules and Regulations for the Measurement of Mason-work in this district, or wherever the Glasgow mode of measurement is adopted, have completed their work, and reported to the Council. They had before them the draft Rules prepared by the Institute, those prepared by the Institute of Measurers, and by the Master Masons' Association. After careful consideration of the three sets of Rules, the Committee found that, except in a few instances, there are no serious differences in the rules as prepared by the three bodies, and they recommend that representatives of the two Institutes and the Master Masons' Association should meet to discuss and, if possible, agree on one set of rules, so that uniformity of practice in regard to this important matter may be secured in the future. In order to facilitate the work of this proposed conference, the Committee prepared a statement showing in parallel columns the rules applicable to the measurement of each department of mason-work as suggested by the three bodies. Representatives from the Institute have been appointed, and the Institute of Measurers have been communicated with, but their reply has not yet been received. The Table of Fees issued by the Glasgow Institute of Measurers has also been considered and reported on by the Committee of Council,—Mr. Sellars, convener,—appointed for that purpose, and a communication has been sent to the Institute of Measurers." . . . .

"At a meeting of the Alexander Thomson Memorial Trustees, held in October, 1884, it was reported that a suitable investment had now been found for the Trust funds, and Mr. John Shields was appointed Factor and Secretary to assist the Trustees in the administration of the Trust."

Mr. William Landless, the treasurer, submitted the financial statement.

On the motion of the president, seconded by Mr. M'Gibbon, the report and treasurer's statement were unanimously approved of, and ordered to be printed and circulated among the members. On the motion of the president, seconded by Mr. Campbell Douglas, the following gentlemen were unanimously elected to be members of council for the ensuing year, viz., Messrs. James Sellars, jun., William Landless, Hugh Barclay, John Gordon, John Murdoch, Robert Turnbull, T. L. Watson, David Thomson, James Thomson, Alexander Skirving, Wm. F. M'Gibbon. On the motion of Mr. Campbell Douglas, a cordial vote of thanks was awarded to Mr. James Thomson, the retiring president.

At a meeting of council, held after the general meeting, the following were elected as office-bearers, viz., Messrs. James Sellars, jun., 265, St. Vincent-street, president; Hugh Barclay, 135, Wellington-street, vice-president; William Landless, 227, W. George Street, treasurer; John Burnet, 167, St. Vincent-street, auditor; William Maclean, 81, Bath street, secretary.

Amsterdam Exchange Competition.—We have already noted the constitution of the jury for deciding this important competition, and that Professor Kerr had been appointed to represent England. We regret to learn that in consequence of recent ill-health Professor Kerr has been obliged to relinquish the appointment. The Municipality have appointed in his stead Mr. R. Phené Spiers,—one of the best substitutes they could have chosen.

The Late Archbishop of Canterbury.—Messrs. Young & Co., of the Eccleston Works, Pimlico, have just completed a bust in bronze of the late Archbishop Tait, by Mario Raggi, sculptor, to be placed in the Edinburgh University. It has been subscribed for publicly.

Illustrations.

BAS-RELIEF: "THE SONS OF CYDIPPE."

BY MR. GEORGE TINWORTH.

THIS bas-relief, executed in terra-cotta by the artist, and which has been exhibited, along with other terra-cotta work from Lambeth, at the Health Exhibition, is interesting, to those who know Mr. Tinworth's previous work, as a work in a style entirely different from what he has previously done. Hitherto Mr. Tinworth has treated mainly Biblical subjects, in a manner which may be called Gothic; high relief,—often throwing the figures entirely up from the ground,—energetic action, and force of light and shade, having been the characteristics of his design. Here we have a purely classic subject treated in delicate bas-relief, a style, we may observe, not so well suited to clay as to marble or bronze. The work represents, of course, the well-known story of Cleobis and Biton, the pious sons of Cydippe, the priestess of Juno, who themselves drew her car to the temple when the sacred oxen were not forthcoming or were recusant, and for whom the mother implored the greatest blessing the gods could grant, a prayer which was answered by their falling presently into a deep sleep from which they never awoke. Mr. Tinworth varies a little from this version of the legend, as he represents Cleobis and Biton as falling in death at the moment of their mother's prayer, and on the very steps of the temple. The work was produced, we understand, with direct reference to a poetical version of the legend by Mr. Gosse, the prayer of Cydippe, at the moment of action chosen by the sculptor, being thus rendered by the poet:—

> "Hear me! and grant for these, my pious sons,
> Who saw my tears, and wound their tender arms
> Around me, and kiss'd me calm, and since no steer
> Stay'd in the byre, dragg'd out the chariot old,
> And wore themselves the galling yoke, and brought
> Their mother to the feast of her desire;
> Grant them, O Hera, thy best gift of gifts!"

In a later replica of the work, Mr. Tinworth has draped the right arm of Cydippe, which, as in the original design here shown, stands out rather harshly, and seems to need something to connect it with the adjacent parts of the composition.

DESIGN FOR ADMIRALTY AND WAR OFFICES.

MESSRS. MALCOLM STARK AND J. LINDSAY, ARCHITECTS.

WE give a small view and some details of this design, and one plan only, the authors having preferred the publication of the sheet of details to that of the second plan. The plan appears to us inferior to most of the nine, but the design is a pleasing and graceful one in general grouping. The following are the architects' notes, sent to us in explanation of their views:—

"The authors have adopted architecture of a Palladian type, as being best adapted for a large public building, and being in perfect harmony with the surrounding structures, while it also in its treatment admits of ample light. The block-plan of the buildings has been carefully studied, and with a view to give the maximum of light and air, and direct and dignified entrances from Whitehall to Spring-gardens. It was the opinion of the authors a T-shaped form of quadrangle was most convenient. In the arrangement of corridors, a plan of the most direct and simple form was adopted. On each flat the arrangement would be repeated. One of the features of the design is one large staircase for the War Office and one for the Admiralty for the principal departments, entering from the grand quadrangle. Entering from Whitehall, one large public staircase for the War Office and one for the Admiralty was considered necessary.

The use of Portland stone was recommended for all the external walls, and Scotch granite for the basement walls to the level of the base course."

Key to References on Plan.

THE WAR OFFICE.

A. Staff.
B. Surveyor-General's Department.
  B 1. Director of Artillery.
  B 2. ,, Supplies.
  B 3. ,, Contracts.
  B 4. Inspector-General of Fortifications.
C. Central (or Secretary of State's) Department.
  C 1. ,, ,, ,,
  C 2. ,, ,, ,,
  C 3. ,, ,, ,,
  C 4. ,, ,, ,,
D. Finance Department.
  D 1. Finance Department.
  D 2. Auditors.
E. Military Department.
  E 1. Military Secretary.
  E 2. Adjutant-General and Quartermaster-General.
  E 3. Intelligence Department.
  E 4. Deputy Adjutant-General R.A.
  E 5. Deputy Adjutant-General R.E.
  E 6. Army Medical Department.
  E 7. Military Education Department.
  E 8. Commissary-General's Department.
  E 9. Principal Veterinary Surgeon's Department.
F. Miscellaneous.
  F 1. Army Purchase Commission.
  F 2. Judge Advocate General.
  F 3. Pay Office. Commissariat and Transport and Ordnance Store Corps.
  F 4. Pay Office. Army Hospital Corps.
  F 5. Army Sanitary Committee.

THE ADMIRALTY.

A. Board-room Suite and Secretary's Department.
  A 1. Board-room Suite.
  A 2. Military Branch.
  A 3. Intelligence Branch.
  A 4. Naval Branch.
  A 5. Civil Branch.
  A 6. Legal Branch.
  A 7. Registry Branch.
  A 8. Record Office Branch.
  A 9. Copying Branch.
B. Hydrographer's Department.
C. Transport Department.
D. Victualling Department.
E. Controller's Department.
  E 1. Director of Naval Construction.
  E 2. Engineer-in-Chief.
  E 3. Director of Naval Ordnance.
  E 4. Store Branch.
  E 5. Dockyard, Ship, Gunnery, and Registry and Copying Branches.
F. Accountant-General's Department.
  F 1. First Division.
  F 2. Second Division.
  F 3. Third Division.
  F 4. Fourth Division.
  F 5. Fifth Division.
  F 6. Sixth Division.
  F 7. Greenwich Hospital Division.
  F 8. Auditors.
G. Director of Contracts Department.
H. Director of Medical Department.
J. Director of Works Department.
K. Naval Reserves Department.
L. Royal Marines Department.
M. Inspector of Naval Schools Department.

HOUSE NEAR TUNBRIDGE WELLS.

THIS house has been erected from the designs and under the personal superintendence of the architect, Mr. James Neale, F.S.A., of Bloomsbury-square, London. The lower story is of red brickwork, with cut brick sills, arches, and dressings. The upper story is of half-timber work and tile hanging. The roof is of red tiles.

ST. JOSEPH'S R.C. CHURCH, MAIDENHEAD.

THIS church, the nave of which is now being erected, stands on a commanding site on the Cookham-road, and will, when complete, with presbytery, &c., form a pleasing group, harmonising agreeably with its site and surroundings. The materials of the neighbourhood are as far as possible being used in the construction of the building, flint and brick forming the walls, with Bath stone introduced where necessary in windows, buttresses, &c., and red tiles for the roof. Inside the building the walls are of red brick, with stone bands, and the roof is an open-timber one, with double principals. The screen at the west end supports an organ, and will also form an internal porch. There is to be, as shown on the plan, a chapel on each side of the chancel, also two sacristies, one of which will communicate with the presbytery. The works now in progress are being carried out by Messrs. Silver, Sons, & Filewood, of Maidenhead, under the superintendence of the architect, Mr. Leonard Stokes, 31, Spring-gardens, London.

SKETCHES BY A DISTRICT SURVEYOR.

II.

THE old church Notre Dame sous Dol, which has been much ill-used and mutilated, is finished with square chevet. The bays of the nave date from the eleventh to the twelfth century, the tower the fourteenth century. The building is now used as a corn-market.

The courtyard of the Hôtel Notre Dame is more attractive on paper than in reality. The external galleries, on to which the room doors open, are reached by a large wooden staircase fixed in what is now used as a kitchen. Wooden huts are said to be more healthy than buildings of brick or masonry as air cannot be excluded, a truth I experienced when in residence at this ancient fabric.

St. Malo has fortifications of great strength, and in the midst rises up the horse-shoe shaped tower (illustrated), which Queen Anne of Brittany caused to be constructed. There is a tradition that she directed her engineer to adopt as his model for the highest forms of this tower the driving-box of a coach with a seat on each side, the mast and ropes doing duty, I suppose, for whip; and as the lady appears to have had a will of her own, after her little quarrel with the Bishop Bricourt about her legal rights, and the placid-tempered motto she had engraved in relief on one of the towers flanking the entry to the château,—"Qui qu'en grogne, ansi sera c'est mon plaisir,"—it may very well be taken to express her regal determination to drive through all obstacles.

The other sketches are from Dol, and were generally referred to in last week's number.

T. E. KNIGHTLEY.*

War and Admiralty Offices.—In reference to a note on their report in our last, Messrs. Maxwell & Tuke write to say that "Messrs. Inigo Jones's hotel" was a copyist's error. Of course we did not suppose it was the architects' own mistake; but the deliberate insertion of the "Messrs." was rather startling.

COMPETITIONS.

Schools, Redruth, Cornwall.—In the competition for the new schools at Trewirgie, for the Redruth School Board, the Board have accepted the design of Mr. John Robert Nichols, architect (of the firm of Messrs. Geo. Berry Nichols & Sons), of Colmore-row, Birmingham.

Vestry Hall, Chelsea.—At the meeting of the Chelsea Vestry on the 14th inst., the Works Committee presented a report,—

"Recommending that three architects be invited to submit competitive designs, together with specification, and estimate of the cost, for the enlargement of the Vestry-hall, and with that object, that the same information be furnished to all three competitors. . . . .

Recommending that competitive designs be invited from the following architects:—Mr. Ernest Flint, A.R.I.B.A.; Mr. Zephaniah King. A.R.I.B.A.; Mr. J. T. Wimperis, F.R.I.B.A.; and that they be requested to submit the same by the 1st of December next.

Recommending that the architect whose design is selected be entrusted with the supervision of the works, upon the usual remuneration of 5 per cent. upon the cost of the works; and that, provided the two next best designs comply with the conditions issued to the competitors, the architects submitting them be paid a fee of 50 guineas each, the drawings to become the property of the Vestry."

After two or three amendments had been proposed and discussed, the Vestry decided to have an open competition.

CHELSEA SURVEYORSHIP.

THERE were eighty-two candidates for this appointment. They were reduced, first to twelve, then to six, viz., Mr. George R. Strachan, of Chiswick; Mr. Charles Clegg, A.M.I.C.E., of Colchester; Mr. E. Latimer Rumble, of Plumstead; Mr. Walter G. Scoones, of Brixton; Mr. Joseph Swarbrick, A.M.I.C.E., of Withington, Manchester; and Mr. James P. Norrington, of Birmingham.

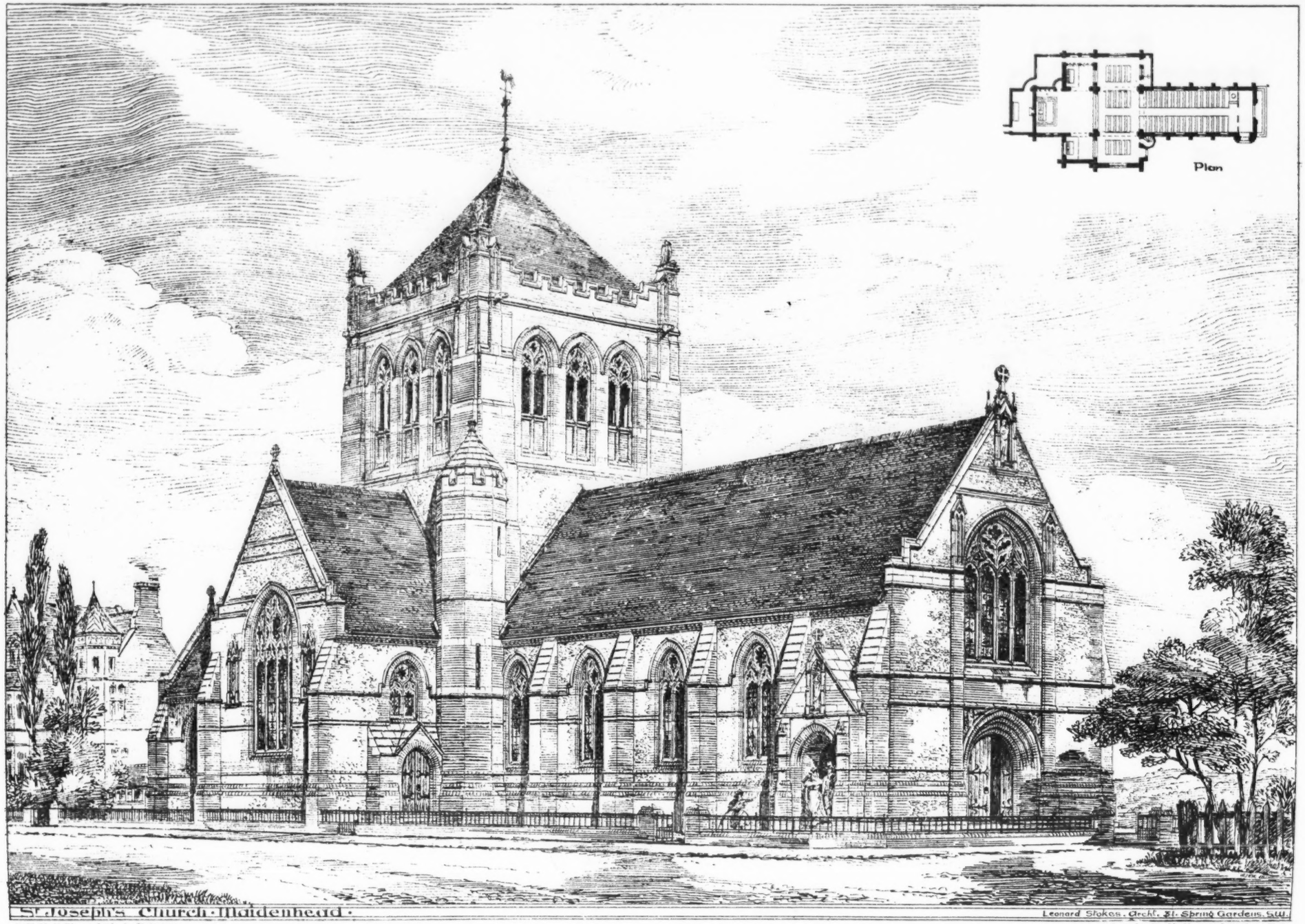
At the election on Tuesday last, these six gentlemen were seen by the Board, and voted upon by ballot, with the following result, viz., Strachan, 30 votes; Clegg, 10; Norrington, 3; Rumble, 2; Scoones, 1; Swarbrick, 0. Mr. Strachan was declared to be elected.

The salary is 400*l.* per annum.

We learn that Mr. G. H. Stayton, the retiring surveyor, will hand over his duties to his successor at the end of this month, prior to his departure for Australia on the 12th prox. A farewell dinner to him took place on Thursday evening last, at the Holborn Restaurant, when the members of the Chelsea Vestry presented him with a testimonial.

The Nicholson Institute, Leek.—In the list of contractors for this building given in our last (p. 539), the name of Mr. John Stones, of Ure Mills, Ulverston, who supplied the lift, should have been included.——The wood block flooring was laid by Mr. R. L. Lowe, of Farnworth, Bolton, on his improved system. The blocks are only 1½ in. thick, 1 ft. 3 in. long, and 3 in. wide, laid parquet-wise in Mr. Lowe's patent composition, not in bitumen. Floors laid on this principle are spoken of very favourably by those who have used them.

* The signature was omitted by mistake last week.



St. Joseph's Church, Maidenhead.

Leonard Stokes, Archt., 31, Spring Gardens, S.W.

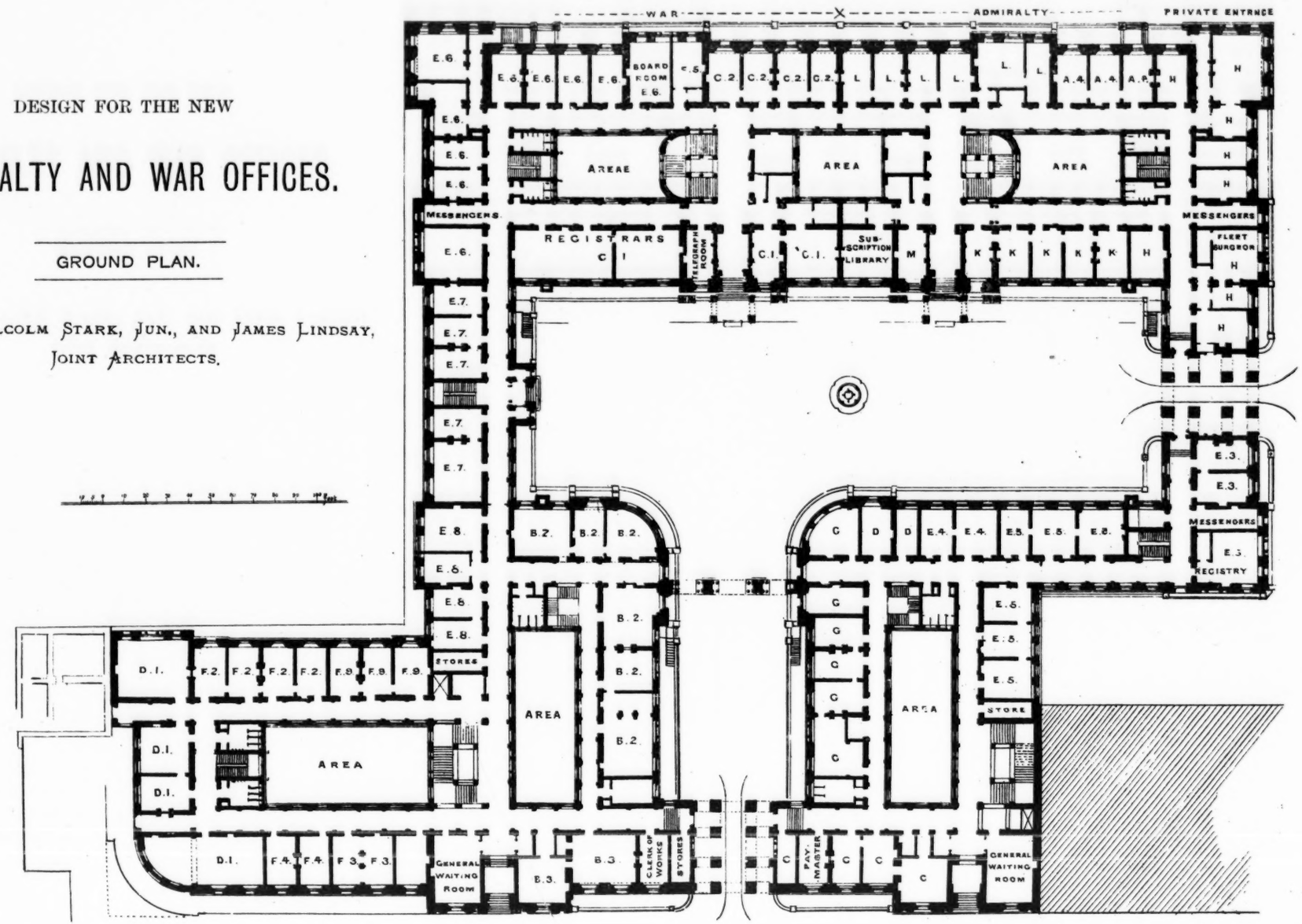
C. F. Kell Photo-Lith & Printer 8, Castle St. Holborn, London, E.C.

DESIGN FOR THE NEW

ADMIRALTY AND WAR OFFICES.

GROUND PLAN.

MESSRS. MALCOLM STARK, JUN., AND JAMES LINDSAY, JOINT ARCHITECTS.



Wyman & Sons, Photo-Litho.

C^t Queen S^t London, W.C.

DESIGN FOR NEW ADMIRALTY AND WAR OFFICES.

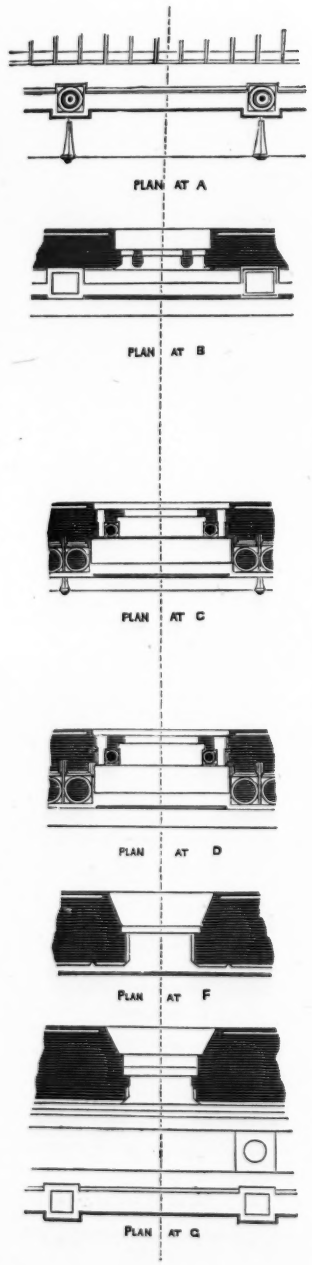
MESSRS. MALCOLM STARK AND JAMES LINDSAY, JOINT ARCHITECTS.

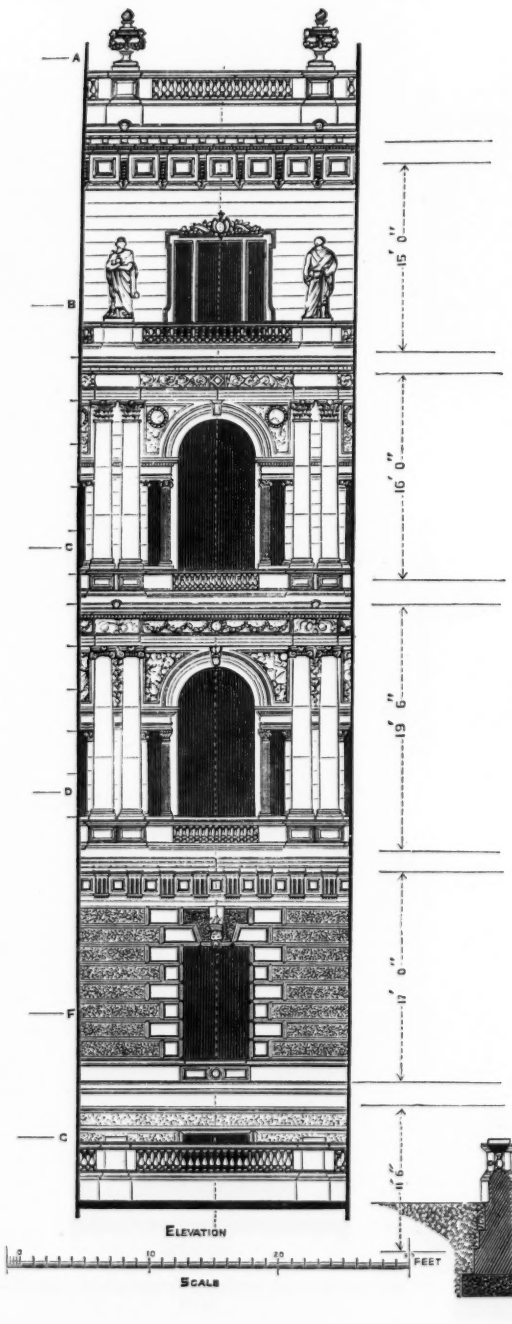
Park Front.

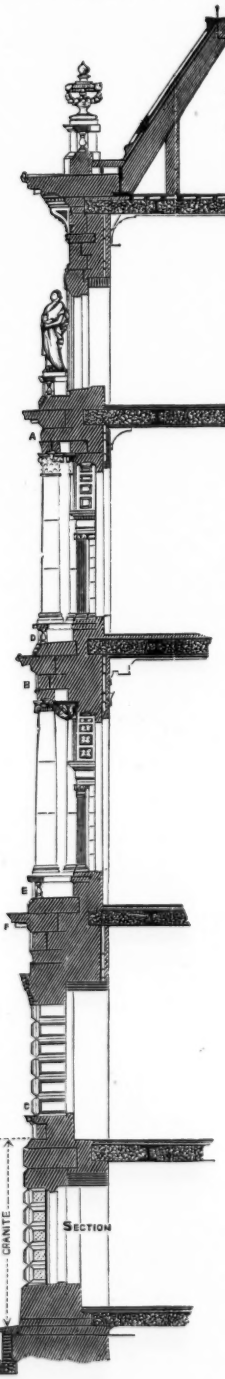
"Ink-Photo" Sprague & Co. London, E.C.

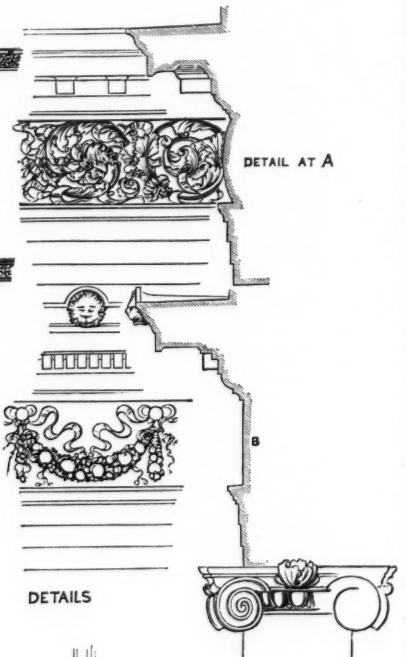
BAS-RELIEF: "THE SONS OF CYDI[illegible]E,"

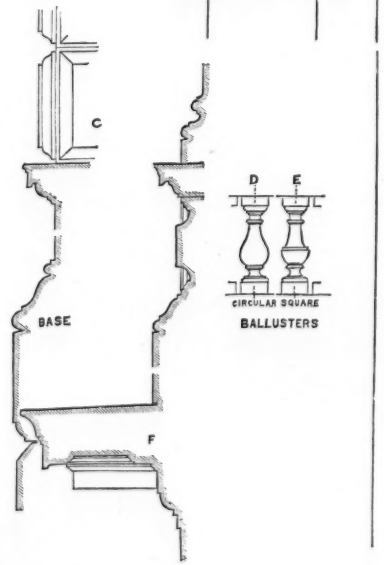
YDI E," MR. GEORGE TINWORTH, SCULPTOR.

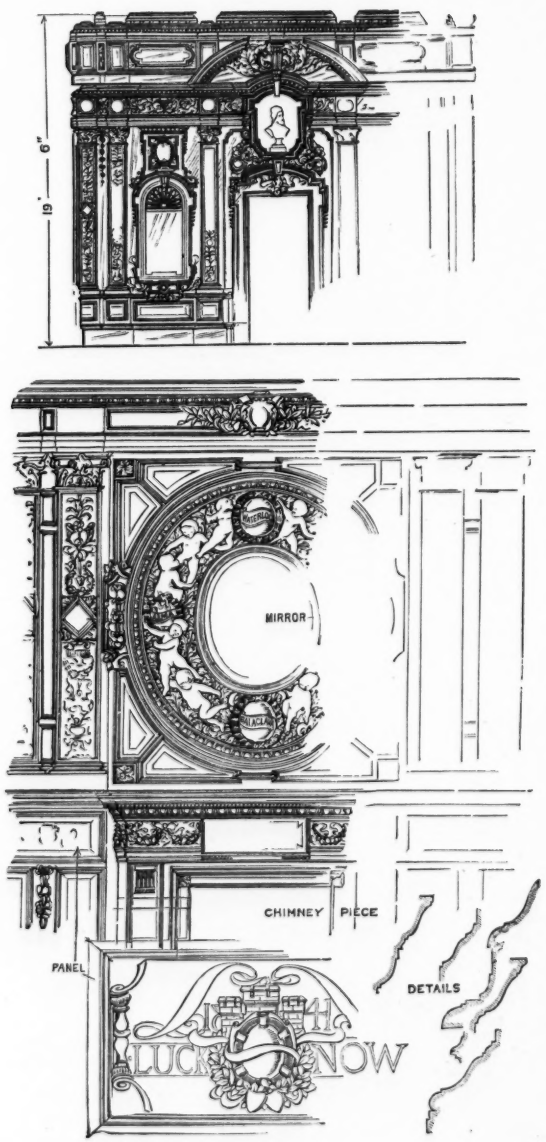




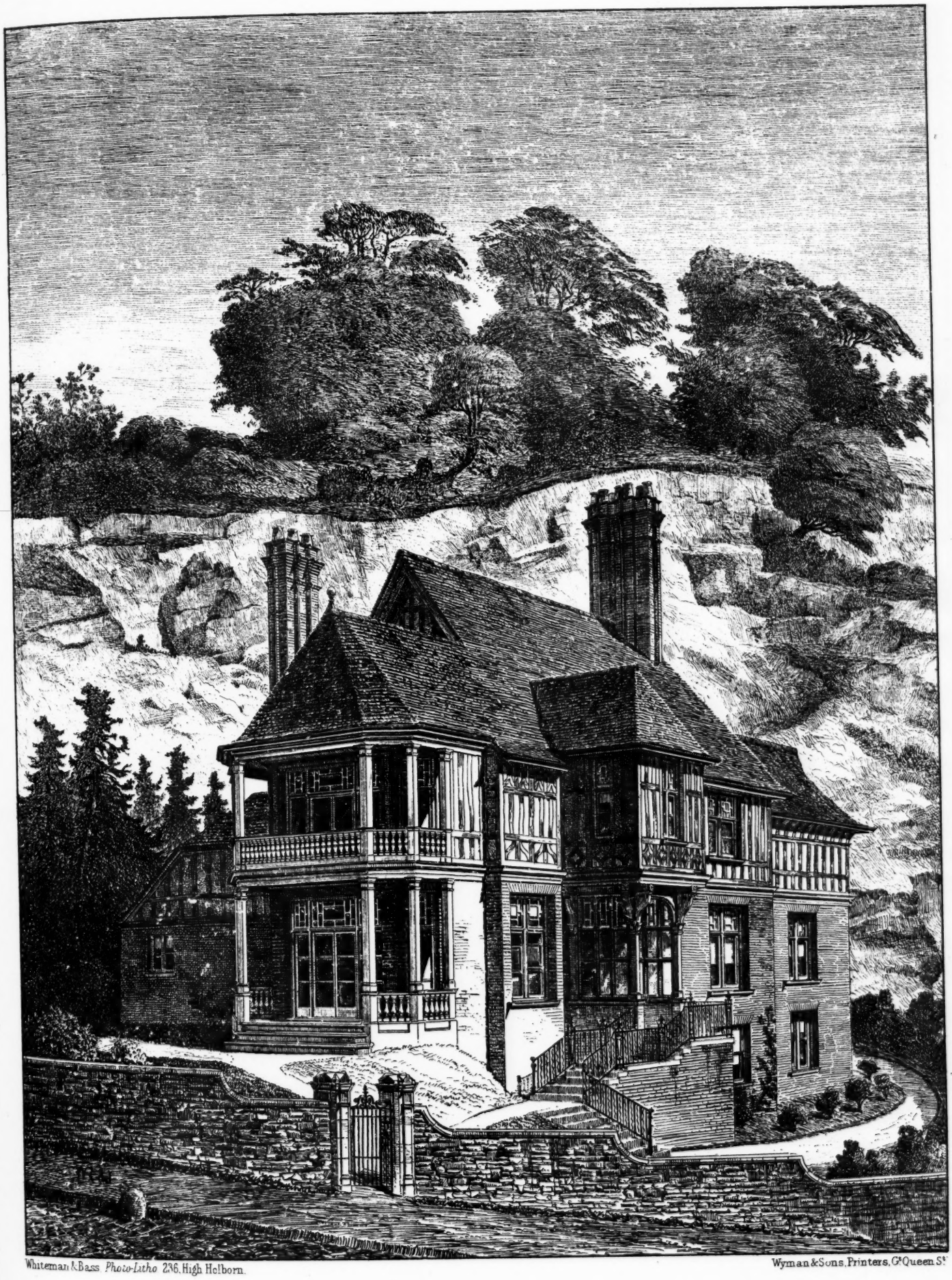








DESIGN FOR NEW ADMIRALTY AND WAR OFFICES: VARIOUS DETAILS.——MESSRS. MALCOLM STARK AND JAMES LINDSAY, JOINT ARCHITECTS.



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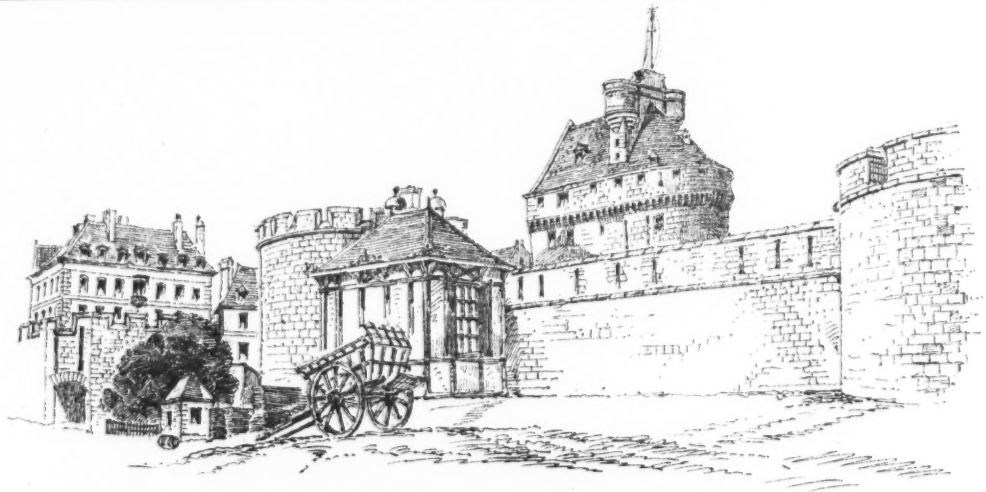
HOUSE NEAR TUNBRIDGE WELLS.—MR. JAS. NEALE, F.S.A., ARCHITECT.



Fortifications St Malo. from the docks.

Dol. Disused Church now a Corn Market.

Dol.

Dol. Courtyard of Hotel Notre Dame.

C F Kell Photo-Lith & Printer.

8 Castle St Holborn London E C

SKETCHES BY A DISTRICT SURVEYOR. No 2.

NOTES FROM BIRMINGHAM.

Few, if any, towns in the United Kingdom will be so well supplied with public buildings as Birmingham, when those which are projected and in progress are completed. In this respect, at least, the borough has well sustained its motto "Forward." Its town-hall is one of the finest-proportioned Classic buildings in the world, and although its interior is now marred by a decoration altogether foreign to the character of the building, it is to be hoped that when the time comes that this interior requires redecoration, it will be placed in the hands of a competent Classic architect. The Crompton-Winfield electric lighting of this great hall, under the direction of Mr. Lea, has been a great success, and is much appreciated. Its cost alone prevents its being used on all occasions when artificial light is required. This the promoters assure us will be much lessened when the area for which they have a provisional order, and which is bounded by New-street, High-street, Bull-street, and Colmore-row, is also lighted on their system.

The new Council-house and Art-Gallery is also a noble monumental building taken as a whole, although the latter portion, now approaching completion outwardly, is marred by one or two very decided blemishes. This building (the art-gallery part) completes the block surrounding a quadrangle, and is being built at the entire expense of the Gas Committee of the Corporation out of the profits arising from that department, and will provide offices on the ground-floor towards Edmund-street for the transaction of their business (which will then be removed from the old offices in the Old-square), and an Art-gallery and Museum above, the entrance to which will be in Congreve-street, opposite the Dawson Statue, and which is emphasised by a colonnade and pediment, to be filled with figures. Adjoining, on the angle of the building, rises a lofty square clock-tower, having pediments over the clock faces, and surmounted with a truncated pyramidal roof, with dormers, and covered with *red tiles* and iron cresting. This is blemish number one. Another consists in the indiscriminate employment of cylindrical ventilators, with conical tops, of which there are no fewer than nineteen visible from Edmund-street and three from Congreve-street. One would have thought that having a lofty tower at hand it would have been used to further the ventilation, and *that* part of an architect's business not be relegated to a patentee, whose aim would possibly be to use as many of his own productions as possible, without regard to their effect upon the elevation of the building. A third blemish is the employment of large areas of skylight in the plane of the roof which is very flat, and well seen from the street. Apart from these little matters, the building is a noble one, and reflects honour upon the architect and the town. By the terms of the contract it ought to be finished by this time, but there is probably another twelve-month's work yet to be done before it can be opened to the public.

The new Liberal Club, which is rising to the third story above the street, at the other corner of Congreve-street, will be a lofty and imposing building in red brick and red terra cotta, supported towards the Memorial-square by massive circular red granite columns on the ground floor, and having its main entrance on Congreve-street. It is in the Gothic style, and has boldly-projecting oriel windows on the angle and Congreve-street side, and balconies on the other side. Its progress has been much retarded, waiting for terra cotta.

Lower down Edmund-street, adjoining the Medical Institute, the new School of Art,—a red brick building, with red terra cotta and Horseley Castle stone dressings, also in the Gothic style,—is up to the roof, now going on. This building is another instance of the public spirit of Birmingham citizens. The land has been given by Mr. Colmore, and 10,000*l.* each has been given by Miss Ryland and the Bros. Tangye, and the latter have also undertaken to bear any additional expense incurred in completing the building. On the other side of the Medical Institute are the new offices of the Birmingham School Board, now occupied; and adjoining them is the still incomplete block of new parish offices, with its lofty clock tower a very prominent object in the view, and its main entrance below. This is a fine building in the Italian Renaissance style, having frontages to three streets, and containing, besides the necessary offices for the transaction of the business of the guardians, a large and lofty reception-room or ball-room, and its being there seems to imply that, however hard the times may be, the guardians and their friends are indisposed to allow such considerations to prevent them from enjoying social intercourse at the ratepayers' expense. So much, indeed, is this felt, that one of the guardians recently moved a resolution that the new offices be disposed of, but he obtained little support. The workhouse at Winson Green is being almost constantly enlarged, in spite of its already capacious size.

So many old-fashioned residences, which were occupied formerly by medical men, having been pulled down in this neighbourhood, a new block of residential chambers has been erected in Edmund-street, opposite the new School Board offices, and is now nearly completed. Its front is of red brick, and white terra-cotta dressings and strings (with an effect decidedly "streaky"), supported on the ground-floor by cast-iron columns, having over them small semicircular white terra-cotta arches.

Lower down Edmund-street, on the same side, and at the corner of Church-street, we have the new Eye Hospital, in red brick and stone dressings, in the Queen Anne style, recently completed and opened. This is a very imposing building, having frontages to Edmund-street, Church-street, and Barwick-street. Some considerable delay was caused in its progress by the bankruptcy of the contractor.

Another instance of the public spirit of Birmingham has recently been shown by the announcement that Mr. Jaffray, J.P., one of the proprietors of the *Daily Post*, who had taken an active part in the management of the General Hospital, and, therefore, knew well its wants, had determined to build and present to the use of the public, with the freehold, a convalescent hospital at Erdington, a very salubrious suburb, and invitations were sent out to the public to contribute to an endowment fund. This was liberally responded to, and some 23,000*l.* subscribed. The hospital is now in progress, and will be a red brick building, covered with red tiles, consisting of an administrative block, with two wings, and arranged so that two other wings may be added afterwards. The ornamental grounds will be also of considerable extent. Some extensive additions have recently been made to Oscott College in this neighbourhood, and further enlargements are contemplated.

A large block of shops and offices is now going up on the corner of Bull-street and Corporation-street for that "general provider," Mr. Lewis, of Liverpool and Manchester; and in Corporation-street adjoining, a further block for Messrs. Jevons & Mellor, in extension of their very handsome new premises just completed in the French Renaissance style. A new block of warehouse buildings on the opposite side of the street is noticeable chiefly for having all the windows above the shop rectangular in one sheet of plate glass opening on a vertical axis, and the whole of the outside of the sash gilded. Another block of shops and offices, with a frontage in the Queen Anne style, is being completed at a new corner formed by continuing London Apprentice-street (now Dalton-street) into Bull-street, by abolishing the Old Coach-yard. Here the architect has made all his bay windows the full height of the building above the shops, in wood, and painted them a pale green. Adjoining these in Bull-street, the Messrs. Southall, chemists, have had their premises remodelled, and a new front built, and at the back in the Lower Priory an extensive range of warehouse building for their wholesale trade. The old chapel at the back of the Conservative Club in Union-street is to be removed as soon as a new one can be built on vacant land adjoining the new Grand Theatre in Old Square. It is understood the architects are now preparing the plans. The new North-Western Arcade is a remarkable building in continuation of the Great Western Arcade from Temple-row to Corporation-street, and parallel to Bull-street. It is built over the tunnel of the Great Western Railway; and although a heavy and lofty building, is supported entirely on brick piliars carried down outside the tunnel to its foundation, with heavy riveted plate girders spanning the arches above on which the building rests. The shops inside the arcade have let uncommonly well, and there is a dry promenade in all weathers from Corporation-street to Colmore-row, except crossing Temple-row: the effect has been to draw off from Bull-street the folks who go shopping, and to very materially reduce the business of those shop-keepers who have their premises there.

The Midland Educational Company, who supply most of the public and private schools of the Midlands with books and school requisites, have had built for them a large and lofty warehouse in Corporation-street, extending through to Cannon-street, and have recently removed into it. It has a red brick front with Bath stone dressings in the Italian Renaissance style, and is very pleasing and effective. Another warehouse for a wholesale and retail stationer has been built in Cannon-street, with a frontage in Cherry-street, also, in the Queen Anne style. At the bottom of Cannon-street, and in New-street, the old shop property which had been there so many years has been bought by the proprietors of the *Daily Post*, and a new block of shops and offices in continuation of the *Daily Post* block has been built, and is now fully occupied.

The very large extension to New-street Station is proceeding, and the construction of the bit of new line for the Midland from Granville-street to New-street Station, and the widening of the road from Granville-street to King's Norton Junction will, it is expected, be complete, with its double line of rails, before Midsummer next. All the Midland traffic to and from Birmingham will then pass that way, leaving the old main line for local and through traffic. The New-street Station now covers 11 acres. The new bridge across the centre of the station in continuation of the old bridge is open to the public, but some improvement ought to be insisted on at its junction with the old bridge, where the undulations of the floor are like the waves of the sea. The platform for the Harborne line is being considerably widened, and a better road made from it into Pinfold-street, and a new block of booking-offices (how that name sticks) are being built for the Midland at the corner of Worcester-street next the Market Hall. A new and handsome hotel has been built and opened at the corner of Dudley-street and Station-street, and a large block for a firm of coach and cab masters is going up. A block of new warehouses had just been completed in Hill-street, and another new hotel, close by at the corner in John Bright-street, where also some extensive half-timbered buildings are going up.

In the Bristol-road, corner of Nelson-street, the new red stone Chapel in the Gothic style for the Old Meeting congregation, whose chapel was removed to make way for the new station, is going up. The large school-room adjoining is already complete, and the services are held therein temporarily. Here the contractors have in use a Scotch crane, worked by steam power, the massive jib of which fell recently, fortunately without much damage being done,—none at all to any person, but causing considerable delay and consequent loss to the contractor. Very great care ought to be taken not only to have these cranes securely fixed upon their high platforms but also to have their chains frequently tested, especially in winter.

The new fish-market, so long delayed by the bankruptcy of the contractor, is again proceeding under another contractor. Provision has been made for cold store-rooms and ice factory by going down a double cellar into the rock, under the new portion, which is to that extent an extension of the old area. It is much to be desired that no further delay will take place with this market, for the trade is an extensive and growing one, and the present accommodation, although of comparatively recent provision, is miserably inadequate for the town. It is a curious fact that Birmingham is better supplied with fish than either London or Liverpool.

The agitation against the proposed removal of the live cattle market from the centre of the town to what is known as the Rupert-street site has, apparently, along with the proposal itself, died a natural death. It is very doubtful if we shall ever hear of the proposal again. Not only was the site objectionable in itself on account of its position and surroundings, but the fact that one line of railway enjoyed a monopoly of entry to it, which it was not willing to share with the other two lines which come into the town, formed an insurmountable objection. The town would have acted unwisely to have laid out 70,000*l.* or more under such conditions. It will, probably, now

wait for its new market until the boundaries of the borough are extended, when there will be a much better choice of sites on now vacant land. The market must be within the borough boundaries to enable toll to be collected. Meantime it is intended to cover over the whole of the present market site with roofs corresponding with that over the adjoining vegetable market, and the Markets and Fairs Committee have been authorised to proceed with it. This, however, makes no provision for a meat market to replace the very inadequate present one. For this purpose it might be well for the Corporation to acquire the whole of the site bounded by Edgbaston-street, Pershore-street, Dean-street, and Jamaica-row, which is now a most insanitary area, and by cutting a street, say 60 ft. wide, through from Jamaica-row to Pershore-street and another at right angles from Dean-street to Lease-lane, and build shops on each side with cold stores below, and cover the same with a cylindrical iron and glass roof, with a dome at their junction. This arrangement would give four entrances to a spacious market, and would disturb only 60 ft. on each of the four streets for shops and entrance gates, and would leave the present miserable market intact with its adjoining slaughter-houses until the completion of the new market. E. G.

PRACTICAL TESTS WITH WATER-METERS AT THE HEALTH EXHIBITION.

Amongst the various questions affecting the future water-supply of the metropolis or elsewhere is that of the registration of the quantity of water supplied either in bulk or to individual houses. The expediency of introducing any system of meter into the supply of a town has, as our readers know, been the subject of much controversy; indeed, Mr. Hawksley has expressed an opinion that "the effect of supplying water by measure would be exceedingly detrimental to the health of the population," and after giving numerous reasons against the adoption of house-meters, concludes by saying, "After long experience on the subject, I am utterly opposed to the often-suggested plan of supplying water for domestic consumption by measure." Whether this judgment be right or wrong, however (and we are disposed to question it very much), the recent experiments and tests with water-meters at the International Health Exhibition are of a very interesting character, and the executive Council having adopted Messrs. J. Tylor & Sons' inferential meters for the registration of the quantity of water consumed by the fountains, we are induced to give the following facts in connexion therewith.

The water for the fountains is supplied by the West Middlesex Company. In close proximity to the basin are constructed two oblong pits, lined and paved with glazed bricks, —which contain in one a nest of three 8-in. meters and in the other a 12-in. meter. The former is shown in the accompanying illustration, fig. 1. Upon the occasion of a recent visit, during a period of half an hour the three 8-in. machines registered 4,000, 4,100, and 4,000 gallons respectively, whilst the 12-in. meter recorded 8,500 gallons,—showing that in this interval of time, which is usual, upwards of 20,000 gallons of water had been projected into the air. Having had an opportunity of minutely examining the whole of the operations of these displays, both by watching the meters during play and in the operating-room under the fountains, we are able to express a confident opinion that these meters have been subjected to a very severe test, with very satisfactory results. Indeed, we are given to understand that Sir Francis Bolton has stated that he is surprised to find they have stood so well, as the recoil during the shooting of the high jets must be very great; at such periods the pressure-gauge has recorded 220 ft. It should here be stated that attached to the nest of meters at each end is fixed one of Bourdon's and Smith's pressure-gauges respectively, whose registrations are almost identical.

Only those who have visited the operating-room during a display can form any conception of the severity of these tests, and we were well repaid for the inconvenience and discomfort of the experiment; and whilst upon this subject we would suggest that if the authorities decide to continue these very popular displays at succeeding exhibitions, it would be very desirable to enlarge the operating-room, and connect it with the mainland by a subterranean passage, it would facilitate matters, as we have no doubt that large numbers of the general public would willingly pay a substantial fee to have an opportunity of witnessing the manipulation of the various appliances used in promoting their pleasure and amusement, added to which is the paramount necessity of reducing the very exhausting effects of the present cramped, inaccessible, and badly-ventilated cell.

We pass from the meters attached to the fountains to one fixed in the East Central Gallery, where may be seen the registration of the quiet and steady flow of water under small pressure. A willow ball may be observed to be sustained upon the slightest jet of water passing through a meter, attached to which (equally with those in the ground) is one of Tylor's "Patent Waste-detecting and Registering Clockwork Apparatus," as shown in the accompanying cut. It will be noticed that this apparatus consists of a pencil, A, fitted with leads or dye to mark on the paper; B, B, are rollers giving motion to the paper; C is the pendulum of the clockwork, adjustable by means of a screw; D is the dial of the clock; E, a roll of paper sufficient to last six months; F, a rim to support the metal cover; and G, a lever connecting the pencil to the meter, which is disconnected at H, when the registering apparatus is removed. By this ingenious machine the quantity of water passing through the meter is recorded every hour upon the paper strips, in illustration of which we reproduce three diagrams taken at the Houses of Parliament, upon the occasion of important debates on the 20th, 22nd, and 23rd of June, 1880, whereon will be seen that each vertical jump of the zigzag line represents 500 gallons, so that the quantity passing during the hour will be shown by the number of jumps and fraction of 500 gallons. The water in this case is used for driving the ventilating machinery of the House, as well as for other purposes, which accounts for the large quantity registered; and it is somewhat amusing to find the heated temper which gave rise to a crowded house and a warm (in every sense) discussion, thus mechanically registering itself by meter.

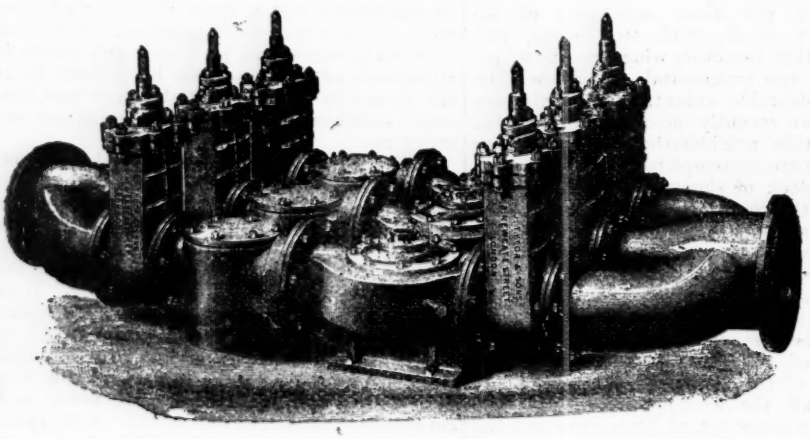


Fig. 1.

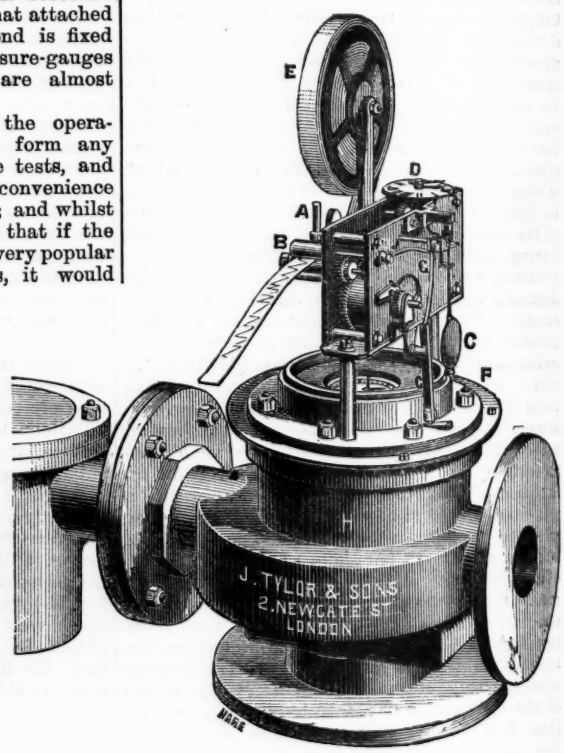
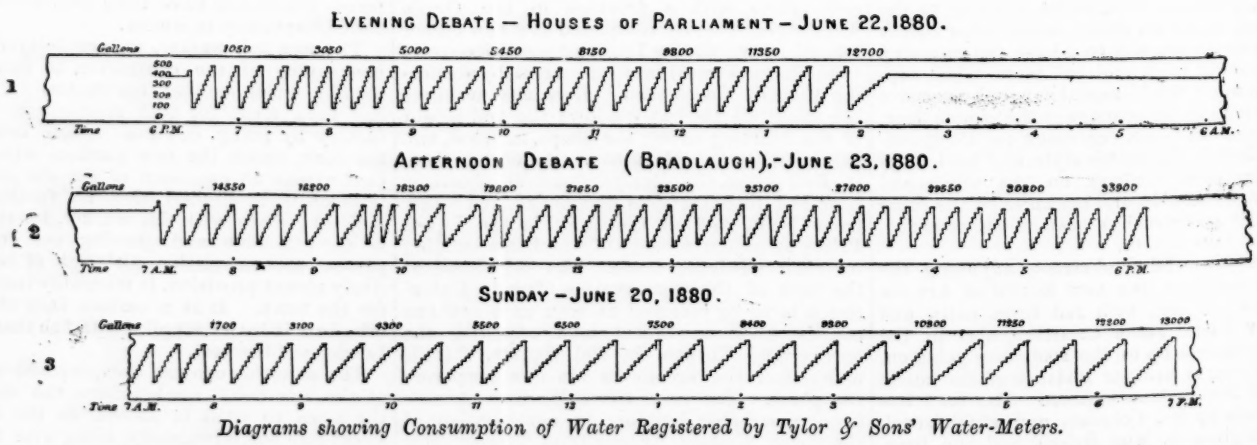


Fig. 2.



Diagrams showing Consumption of Water Registered by Tylor & Sons' Water-Meters.

ARCHITECTURE IN RELATION TO LANDSCAPE GARDENING.

In the third of his course of lectures delivered at the Crystal Palace on Wednesday afternoon last, Mr. G. Richards Julian dealt with Norman and Gothic architecture. He pointed out that the Norman style, when once planted here, soon exhibited a growth of features by which it was easily distinguished from that form of it which prevailed in Normandy, and proceeded to enumerate in detail the characteristics of the English variety. After a few words on the domestic architecture of the period, the lecturer called attention to the Natural History Museum at South Kensington, designed by Mr. Waterhouse, of which he said that if it be not a revival of the Romanesque style, it is, although freely treated, imbued with much of its spirit, and ornamented with many of its details. He recommended the students to take an opportunity of observing the balustrades of the staircase and of the gallery in the great hall, from which excellent suggestions for the appropriate treatment of balustrades and piers in harmony with Romanesque buildings might be obtained.

Passing to Gothic architecture, Mr. Julian mentioned the various theories as to the origin of the use of the pointed arch,—firstly, that it was suggested by the Norman intersecting arcades; secondly (Mr. Fergusson's), that it was devised to lighten the weight on the crown of a barrel vault; thirdly, that it was introduced by the Crusaders, who had met with the form in Saracenic buildings in the East; fourthly, Sir Digby Wyatt's opinion that the Normans of France got it from the Normans of Sicily; and lastly, the theory (which Mr. Julian adopted) that the pointed form was introduced to overcome a constructional difficulty, namely, the tendency of large semi-circular arches to spread, and so flatten at the crown. On this view of the matter he quoted some passages from the Academy lectures of Sir Gilbert Scott, delivered in 1860.

Mr. Julian deferred until next week the subjects of the domestic architecture of the Mediæval period, and the appropriate treatment of garden architecture in connexion with Gothic buildings.

PROTECTION FROM FIRE IN THEATRES.

MARYLEBONE THEATRE.

The owners of the above theatre, situate at Church-street, Marylebone, were summoned by the Metropolitan Board of Works for that they, between the 28th day of February and the 9th day of July, neglected to make certain alterations necessary to remedy structural defects in the theatre by which danger from fire might result to the public, after having been served with notice to do so.

Mr. Grain, instructed by Mr. Thos. Burton, appeared on behalf of the Board; and Mr. Besley represented the owners.

Mr. Grain stated that the requisitions served were seventeen in number, and the owners had neglected to carry out ten of them, some of these being of a most important character. The proceedings were taken under the 41 & 42 Vic., c. 32, s. 11, which imposed a penalty of 50*l.* in case of default, and 5*l.* for every day during which such default continued. No notice of appeal having been served, the requisition became finding upon the owners, and Mr. Hebb, Assistant Architect to the Board, was called in support of the Board's case.

Mr. Besley, for the defence, contended that the requisition of the Board had been complied with as far as was practicable, and called Mr. Verity, an architect, in support of his statement.

Mr. De Rutzen said the Act of Parliament was a most important one, and ought to be strictly carried out. He had nothing whatever to do with deciding whether or not the requirements of the Board were necessary. His duty was merely to impose a penalty to show owners of such places as theatres that the requisitions of the Board must be complied with in the interests of the public. He should not impose the full penalty of 50*l.*, but a mitigated penalty of 10*l.*, including costs.

The Albo-Carbon Light.—We are asked to state that the lighting of the Brompton Oratory by the Albo-carbon light (as described in our last, p. 521, *ante*) was effected by the Sanitary Engineering and Ventilating Company, of 115, Victoria-street, Westminster. We hear that this method of lighting has also been successfully applied by the company to several West End Club-houses.

THE DOME OF ST. PAUL'S.

Sir,—Notwithstanding Mr. Robins's own valuation of Thornhill's scheme of decoration, there is the hard-and-fast fact, a fact patent to all who have studied this question, that Sir Christopher Wren sanctioned that scheme, and that it was carried out immediately under the eye of the great architect. The architect and the painter were in favour of colour in the figure compositions, but the Puritanism of the times would not permit such blazonry; any colour would have been then exaggerated into positive scarlet, and any golden overlaying would have been rated as tinsel.

To say that we are in the nineteenth century, and that therefore we ought to do better than in the seventeenth, does, at its first statement, appear to be reasonable, but facts prove that this is not a necessary consequence. We cannot do as well as the architects and artists at a much more distant date than the seventeenth century, and, although in recent years considerable progress has been made in the refinements of art, we have not surpassed the examples of the English Renaissance architecture of the seventeenth century, and neither modern architects nor artists have had any considerable practical experience of the pictorial decoration of such buildings. As an artist who has made mural painting a study, I affirm that, side by side with the experimental projects, Thornhill's is, in architectonic arrangement, immeasurably their superior. Mr. Robins says:—"It is much more an architect's than a painter's province to determine the leading lines and framework of a scheme of decoration." Let this be conceded for the nonce; then I say Mr. Robins's condition has been fulfilled, for Thornhill's architectonic arrangement was designed under no less an architect's supervision than that of Sir Christopher himself,—which of the living architects would Mr. Robins appoint to overrule Wren's sanction?

That the new projects are based on "the fact," as Mr. Robins puts it, "that every plane section of a sphere is a circle," condemns the schemes as being designed on radically wrong principle. The only position in which a circular *plaque* can be appropriately introduced into the decoration of a dome is in the crown of the hemisphere. There are several optical reasons against the introduction of circular *plaques* elsewhere on its surface. But what shall we say to a project suggesting that no less than fifty-six of these, of various sizes, shall be distributed over its surface? Was this scheme, one almost feels tempted to inquire, designed in the interests of the spectacle-makers?

The Renaissance admits of exuberance in decorative display,—of altar-pictures in frames, and of hangings in chapels, of bold and daring flights in decoration, of a prodigality of ecclesiastical furnishing, but there must be a method in this noble rage. It is for this that our painters of interiors set up their easels in St. Peter's, and elsewhere, where they are astonished to see how art was flung about in picturesque profusion, instead of being *finicked on* in small quantities, by mere chamber decorators.

The Renaissance, then, is not a pure but a picturesque style of architecture, admitting of considerable latitude of treatment, of redundancy in decorative display. To talk about shams in reference to St. Paul's, when we know that purists are never tired of pointing out various shams in its construction, is quite useless. It is the opportunity that the style affords for a Titanic hurling of masses,—for, as it were, a reckless surcharge of treatment that conduces to its grandeur. It was the necessity for this largeness of treatment that changed the early tenor of the great Italian mural painters. Gothic proportions, and perpendicularity, were found to be incongruous with the huge developments of the Renaissance. It is for these reasons that Thornhill's arrangement is seen to be more congruous with the architecture of St. Paul's than any weaker and more subdivided project, and although Wren had never been in Italy, and may not have been able to express the reasons of this congruity, the great architect, as a born artist, felt that it was.

W. Cave Thomas.

Sir,—I had not intended again to trouble you on the subject of the St. Paul's decoration. I am induced now to do so only to reply to the question which in your last issue Mr. Thomas puts as crucial. He asks "Would Mr. Clayton consider the translation into mosaic of the work of Sir F. Leighton and Mr. Poynter as the effacement of those eminent painter's designs? Would not the mosaics be virtually their designs?"

The reply is obvious. The mosaics, thus produced, would be not virtually but actually their designs, and this for the reasons which would be fatally wanting in a like rendering of Thornhill's monochromes. The cartoons of Sir F. Leighton and Mr. Poynter are those of living men who expressly made them for mosaic, in effects of gold and colour which were, *ab initio*, part and parcel of their designs. Mr. Thomas cannot cite these or any such conditions to justify a translation of Thornhill's work into colour, which could be none of his, and into gold backgrounds, which were abhorrent to his art.

The one plea upon which Thornhill's work has been condoned, has been its generalised vagueness of effect arising from its monochrome throughout. By the proposed translation of this result into unwonted gold and colour for the pictures within the arcade, the latter would be developed into disastrous and undesigned prominence, while the paintings would become a chromatic fiasco in eight parts. This, too, in the name of Thornhill, and in homage to his memory!

John R. Clayton.

Oct. 22, 1884.

SEA-SAND FOR MORTAR.

Sir,—In reply to the query of your correspondent "F. L." in your last number [p. 542], as to the use of sea-sand in mortar, may I say that I have often wondered why this (as I consider) important question has never, to my knowledge, been set at rest.

Speaking from a long experience in the use of sea-sand, I beg to say I should never hesitate to use it in preference to any other, either inside or outside of any building. As a matter of fact, I built four houses twenty-five years ago without using a particle of any other than unwashed sea-sand, either in brickwork or plastering, and I never had a single complaint from the occupiers about dampness. I have also frequently used it in large houses without discovering any ill-effects from its use, either under paint or paper.

Permit me to say a word as to its value for strength in brick mortar. A few months ago I had to cut away a portion of a two-brick wall in an hotel built eighteen years ago, close to the sea. This wall was built with sea-sand mortar, and I never in my life had a stiffer bit of work to deal with in regard to hardness of mortar.

I should like to see the chemical side of the question settled by a few tests. First, to ascertain the quantity of chloride of sodium in, say, a cubic foot of sand, after standing a day or so to allow the salt water to drain from it; and, further, whether the action of the lime neutralises the effect of the small quantity of saline matter left in the sand when used in the usual way.

H. L.

*** If our correspondent has used *unwashed* sea-sand with these results, our impression is that he has been very lucky.

SUPPORT OF ADJOINING HOUSES.

Sir,—As so many of your readers are engaged in cases which involve the question of the right of support to houses, permit me to call their attention to a decision of the Court of Appeal, which gives a new and surprising illustration of the rule of law on this subject.

A, the owner of two adjoining plots of land, let one plot to B, to make a private road to his cricket-field. He afterwards let the other plot to C to build a house upon it. C built the house, and consigned the lease to D. After D had bought and paid for the house, A, at the request of B, made a drain through the private road, and close to the flank wall of D's house. The trench was considerably deeper than the foundations of B's house. No means were taken by A or B to support D's house while the trench was open, and no notice was given to D to enable him to take such means himself. The effect was that the flank wall of D's house began to slip and crack. The house was rendered uninhabitable. D was obliged to underpin the flank wall, and repair the house, at the cost of several hundred pounds. To recover this outlay, he brought an action against A. Mr. Justice Manisty and Mr. Justice Watkin Williams held he was entitled to recover, the right of support for the house being "a necessary easement," which the law implies.

The Court of Appeal has now reversed that decision and given judgment for the defendant A. The court held that D had no better title than C, and C had no better title than A, and after the lease A could not have prevented the lessee of the private road from letting down the house, as he had not in the lease "reserved" the right of support. As the

Master of the Rolls said, if the parties had been asked at the time if they intended that the house should have the right of support they would have answered in the affirmative; but this did not avail the unfortunate purchaser. The right of support was not "necessary" in the strict sense of the word, for by underpinning as deep as the drain, the house could have done without the support of the adjacent soil.

Lessees of houses which have not stood for twenty years may learn from this case that another and serious risk has been added to their property, and one which no previous inquiry or precaution would have enabled them to avoid.

The freeholder who builds his house close to the boundary knows that he runs the risk of his churlish neighbour letting it down; but up till the present time few lessees have been aware that the adjoining lessee who holds under the same landlord may, merely on the ground that his lease is earlier in date, have the right to let down his neighbour's house.

This novel application of an old rule of law will perhaps surprise some of the lessees whose wrongs are said to require remedial legislation. R.

ST. PANCRAS MORTUARY COMPETITION.

Sir,—May I be allowed to say a few words in answer to the letter of Mr. H. H. Bridgman in your issue of the 11th inst. He tells us that an Act of Parliament prevents the Vestry from building the mortuary on the site for which competition drawings were asked (Feb. 2, 1884): hence the delay in decision. He also inserts a copy of a letter showing that his drawings are one of the (six) selected for further consideration when the new site is found. In my opinion, it is unfair to make any selection under the above circumstances, as totally different designs would have been sent in on another site. I think as the old site is not to be used that fresh competition drawings should be asked for. It would be as well if the Vestry said whether drawings were to be under motto or otherwise in future competitions, as a great many signed their drawings.

J. C. Waghorn.

HIDDEN DANGERS.

Sir,—Any person passing the Royal Palace of Justice lately must have seen a yawning chasm in front of the building, leading under the Great Hall; and right into the midst of the wall bases, foundation arches, and so on, have the authorities placed two (or more) huge steam boilers, just where they could do most mischief if they were to give way. A veritable Samson would such a steam generator prove if it went, as boilers do go at times in factories and ships of war. If both were working when one exploded, the chance of the other going too might be reckoned on with some certainty. How many more of these bottled earthquakes are there about under our best buildings? Why not put such dangerous things in an outside shed, which need not be ugly? Bang.

The Student's Column.

ON THE CONSTRUCTION OF FLOORS.

IV.

We now pass to the subject of *Fire-Proof Floors*. The risks of being destroyed by fire to which large warehouses are subjected from the combustible nature of the materials they contain, has drawn the attention of architects to the means which might be adopted to prevent the spread of a fire and confine its action to the story on which it commences. The intense heat that is generated in a large warehouse when a fire takes place, renders the construction of floors that shall be perfectly fire-resisting a matter attended with considerable difficulty, as many substances which will resist a tolerably high temperature become either completely destroyed or else their strength reduced to such a degree as to become practically useless, when exposed to the heat produced in a burning building.

A method commonly adopted at one time of forming what was deemed a fire-proof floor, is shown by fig. 10; cast-iron beams of the section

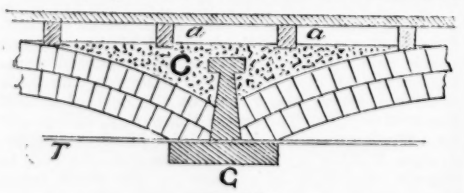


Fig. 10.

shown at G, were laid across from wall to wall, about 10 ft. or 12 ft. apart, and between them were turned two or three rings of brick arches in cement, the contour of the arches being very flat segments of a circle, so as not to take up more depth than could possibly be avoided. The haunches of the arches were filled with concrete, C, and the joists, *a*, laid thereon. To prevent the arches from thrusting out the walls or displacing the girders, wrought iron rods were generally passed through the lower part of the girders, as at T in the figure, being secured with nuts and screws. Experience, however, has shown that when subjected to great heat, the cast-iron beams either broke in pieces or became fused, and allowed the whole floor to fall in. Ordinary bricks also split up under the action of fire, only those made of fire-clay being able to resist a high temperature. Wrought-iron beams have been tried in place of the cast-iron ones, but these become twisted and weakened when exposed to the fire, although they will not fuse as cast-iron does; the longitudinal expansion of the iron is also liable to endanger the walls.

As it is scarcely practicable to make a fire-proof floor without using iron, it becomes an essential point to completely protect the metal from becoming strongly heated, by encasing it in some material capable of resisting the action of fire. A method shown in section by fig. 11,

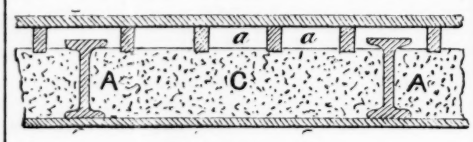


Fig. 11.

which has been successfully used to a large extent, consists in laying rolled iron joists across from wall to wall of size proportioned to the span; close boarding is temporarily fixed to the underside of the joists, and on this is placed a layer of cement concrete, C, so as to cover up the whole of the iron, as shown in section by fig. 11. The iron joists, A, are usually from 4 ft. to 5 ft. apart, and if the floor is to be boarded, light wooden joists, *a*, about 2 in. square, are bedded on the concrete before it hardens. If a cement or asphalte floor is required, it can be laid directly upon the top of the concrete after it has thoroughly hardened. As the concrete becomes set in twenty-four hours, the planking below can be removed at the end of that time, and the under-surface will be ready to receive the usual coating of plaster, if it is desired to form a finished ceiling. If the joists are placed 5 ft. apart, the following sizes may be used for ordinary floors according to the span,—for 10 ft. span, the joists may be 5 in. by 3 in. wide; for 12 ft., 6 in. by 3 in.; for 15 ft., 7 in. by 4 in. Or if joists of ⊥ section are used, they may be 4¼ by 4 for 10 ft.; and 5¾ by 5½ for 15 ft. The floors of corridors which are not more than 6 ft. wide can be made of concrete 5 in. or 6 in. thick without the employment of any ironwork, if well bedded on the walls; or York landings 4 in. or 5 in. thick may be used and will be equally impervious to fire. This kind of floor possesses far more rigidity than one of timber, and is also more sound-proof; and although the weight that it throws on the walls is much greater, yet this is, to a great extent, counterbalanced by the absence of vibration which is often so injurious to the walls of a building.

In warehouses and other buildings of wide span it is necessary to use iron girders and binders as in the manner described for timber floors, and shown on figs. 12 and 13. If a

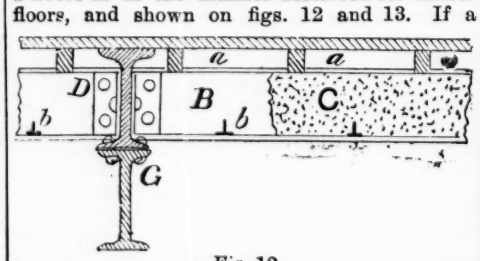


Fig. 12.

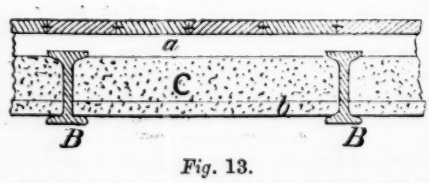


Fig. 13.

single rolled iron beam cannot be obtained of sufficient strength, then the girder G may be formed of one on the top of the other, as previously described and shown by fig. 8; or they may be placed side by side as shown by fig. 9. This latter plan is, perhaps, better, as it is easier to encase the girder in fire-resisting material, which must always be done when iron is used.

Rolled iron joists, B, are laid across from girder to girder in the manner of binders, resting on the lower flange of the girder and being riveted thereto with angle plates as shown at D. Between the binders are laid light wrought-iron joists, *b*, of ⊥ section, and on these are laid the concrete, C, in the manner before described, so as to fill up the space between the binders. Light wooden joists, *a*, can be laid on the top of the concrete to receive a wooden floor. Fig. 12 shows the section of the floor across the girders, and fig. 13 is the section across the binders, at right angles to the former.

As the concrete itself weighs about 140 lb. per foot cube, a thickness of 6 inches will add 70 lb. a foot superficial to the load on the girder, the strength of which must be regulated accordingly. For a span of 18 ft. a single iron joist 19¾ in. deep by 7 in. wide, will make sufficiently strong girder for a warehouse floor constructed in the manner above described. For a span of 26 ft. a pair of rolled joists, 16 in. by 6 in., with ½ in. plate 14 in. wide, riveted at top and bottom, as shown by fig. 9, will serve the purpose of a girder.

Another method of employing concrete and iron for a warehouse floor is shown by fig. 14,

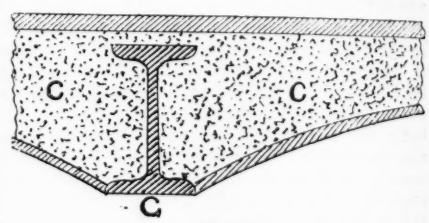


Fig. 14.

where G is the iron girder, C the concrete which is laid upon centering to give it an arched soffit. By this means the whole of the iron can be encased in the concrete, which is made thicker at the springing than at the crown. A concrete in which sulphate of lime is used in place of Portland cement has been much employed for arches of this description, which are often made of considerable span without any iron being used between the girders. The floor is laid on the top of the concrete in the manner previously described, upon joists bedded thereon if a wood floor is required, or a cement floor may be laid directly on the concrete and covered with tiles or asphalte.

If iron columns are employed to support the girders they should be cast solid, as being more capable of resisting the action of fire than hollow ones, which split up into pieces when exposed to great heat, especially if water comes in contact with them when red-hot. It is, however, always advisable to case the iron columns round with some fire-resisting material, such as fireclay, to prevent any risk of their becoming so weakened by the action of fire as to give way under the superincumbent load.

When a floor of stone, tile, or asphalte has to be laid on the level of the ground, the top soil is first cleared away and the earth raised to the required level by means of a layer of broken brick, lime-core, or ashes, upon which the stone flags can be bedded in mortar, their surface being tooled or rubbed and the edges dressed square before being laid. Where asphalte or tiles are required, a bed of concrete 3 in. or 4 in. thick is first formed, and rendered as nearly level as possible; on this is floated a thin coating of cement, which is allowed to harden, and the tiles, asphalte, or other material laid thereon; tiles being bedded and jointed in cement, and asphalte poured on in a semi-fluid state, fine sand being sifted over the surface while still soft.

As a flag-paving if laid on the ground is liable to become damp, it is best to build sleeper walls 3 ft. apart from centre to centre, and to lay the flags across from wall to wall, bedding them thereon in mortar. In this case the flags must be cut to the exact length of 3 ft. By this arrangement the damp is prevented from striking up from the ground, and the floor is kept dry. Ventilation can be maintained under the floor by means of air-bricks in the outer walls.

Sir,—In your "Student's Column" this week is there not an error in giving the *clear* depth of a double iron beam for warehouse floor as 13½ in.?

Also, is there not a discrepancy between the rule and example for finding the deflection? The rule has it, "multiply the cube of the length (in inches) by the load to be laid on the *middle* of the beam; but in the example the cube of length is multiplied by the distributed load, viz., 9½ tons.

JOHN A. MARSHALL.

13, *Prospect-road, Child's Hill, N. W.*,
Oct. 18, 1884.

*** "13½" was a misprint for "10½." As to the alleged "discrepancy," if the writer had read on he would have seen there was none, as it is stated that "the quotient is ·96 the deflection in inches when *the load is all at the centre; but, as in this case, the load is supposed to be distributed over the length of the beam, we take five-eighths of the above, or* ·6 *in. as the deflection in the middle.*"

Books.

Barn Implements and Machines. By Professor JOHN SCOTT. London: Crosby Lockwood & Co. 1884.

OWING to the constant and increasing competition in everything appertaining to agriculture, to secure in this country even a moderate return on invested capital, it has become necessary to conduct farming operations on an improved, or, we may say, a more scientific basis than has hitherto been the practice. The recent advances made by America in reaping and sheaf-binding and other agricultural machinery, and the progress made by some of the Continental nations,—notably Hungary with regard to milling machinery,—have, with other causes, rendered successful competition by English wheat-growers a matter of extreme difficulty.

The issue, therefore, by Messrs. Crosby Lockwood & Co., of a series of farm engineering text-books, by Mr. John Scott, must be considered very *apropos* at the present moment. The one before us "Barn Implements and Machines," No. 5 of the series, we do not consider altogether so worthy of commendation as those that have preceded it. Some of the chapters,—particularly those relating to water, steam, gas, and hot-air powers,—are crude, and the matter not by any means new. In several places they smack very much indeed of the trade catalogue.

We cannot agree with the author's conclusion that "an engine which is merely a portable, and not a traction, engine is now of comparatively limited value on the farm." In point of fact, it is,—owing to hills, bad roads, small fields, and other causes,—only a moderate proportion of the farms in this country that can use a traction-engine profitably, to say nothing of its largely increased first cost. The author remarks that the best makers give 20 ft. of heating surface in the boiler for each nominal horse power." He does not say in what type of boiler; we presume, however, he refers to tubular boilers. We think on inquiry he will find that this amount of heating surface is exceptional, and in the case of the larger tubular, Cornish, Lancashire, and vertical boilers, this statement requires very considerable modification.

The latter part of the book is a great improvement on the first, and the author appears to be much more at home with his subjects. The best chapters are those relating to thrashing-machines, the arrangement of barn machinery, and dairy appliances, and these alone are well worth the price charged for the whole.

Toitures en Ciment de Bois. By CHARLES S. HAEUSLER. Hanover: Th. Schäfer. 1884.

THIS is a pamphlet describing a woody cement for the construction of flat roofs, which is said by the author to have been largely introduced into Southern Germany. The cement is a viscous and bituminous paste, of which the basis is wood, and is stated to be flexible and incombustible; it is put on warm, and becomes when cold metallically hard. The roof is arranged horizontally, or with a very slight rise, and the wood covered with a thin bed of fine sand (about three millimètres); this, again, is covered with alternate layers of prepared paper and wood cement; and, finally, with powdered coal or fine furnace slag dust; on this is placed sand and gravel, which is well rolled, the object being to protect the cement from the deleterious action of the atmosphere. Amongst the advantages claimed for this roof by the inventor are that it is as cheap as an ordinary roof, weighs very little more, is fireproof and weatherproof. The roof has been designed specially to allow of it being used as a garden or playground, and the book contains some illustrations of such gardens, the appearance of which in London would be, to say the least, refreshing. A number of illustrations of different designs for the construction of roofs in wooden cement are given.

The composition of the cement not being stated, we are unable to form an opinion as to the likelihood of its durability: the method of fixing certainly appears rather troublesome, and we should imagine that its success would depend largely on the skill with which the roof was laid, and protected from moisture by proper ventilation, say by free currents of air passing beneath it.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,057, Improvements in Balancing Apparatus for Railway-carriage or other Window Sashes. J. A. Adams, Liverpool.

This device is chiefly for railway-carriage windows and to obviate the defects of the present system. The windows are at present generally lowered with a strap. This strap necessitates an expensive holder and strap, with a stud or holder, and a defect of a more serious kind is the open space between the inner and outer middle rail or cross-bar of the door, down which space or opening rubbish of various kinds, and occasionally lighted matches or fusees, are thrown. The removal of these is only effected with great expense. In this invention cords or wire-ropes are used, and the weights for balancing the sash are placed out of the way. The opening is also covered by a thin strip of wood. The balance-weight or weights preferably take the form of an iron bar, which is fixed, stretching from side to side of the hollow panel or pocket of the door. This bar has india-rubber buffers at each end to deaden the shocks or concussion.

11,509, Improved Process for the Production of Monumental Designs, &c. A. J. Boult, for F. M. Nicholls, of Chicago.

The designs for building monumental or other work are varied by the interchange of blocks or cards with parts of designs cut upon them, and comprising in all but a very few pieces of finished structures, an endless variety of designs by mere mechanical operations may be produced.

11,614, Improved Wheel-barrow. Browne & Co., for Jules George Dreyfus, Paris.

These metallic wheelbarrows are made with the body stamped out of a single piece by a die, and the bottom of the barrow is also stamped from a single corrugated piece of iron or other metal. The frame, too, is corrugated, and the inventor claims lightness and strength, combined with cheapness in manufacture.

1,290, Improvements in the Arrangement, &c., of Receptacles for Coals, &c., in combination with Chimney-pieces or Fireplaces. Arthur Foley, Salisbury.

Into the chimney-breasts, jambs, hoods, or sides, receptacles are introduced for holding coal or other fuel. These are so arranged as to slide in or out, or to move to and fro on hinges, open sideways, fall over, or as convenient for storing and emptying the fuel. The hoppers or drawers are hidden from sight by the fittings, and in an improved form a projection is made at the base of the jamb, which is very convenient for holding coal.

342, Improvements in regulating the Height of Desks and Seats. W. H. St. Ruth, Manchester.

The desk or seat rests on a round, oval, square, or triangular column or shaft, with parallel or with tapering sides, placed in a cavity with a wedge, thin end downwards. When the desk or seat is lifted, the wedge prevents its return. When the wedge is lifted, the desk or seat descends. The wedge is moved by a handle working freely in a slot. This method of fixing the adjustable column is the claim of the patent.

APPLICATIONS FOR LETTERS PATENT.

Oct. 10.—13,388, H. Smith, Coventry, and D. Smith, Birmingham, Improvements in Window-sash Fasteners.—13,390, W. W. Crowder, Birmingham, Automatic Bolt or Fastener for Doors, Gates, Window-sash Frames, and Shutters.—13,391, J. Waller and B. Farringdon, London, Bell Levers and Bell Pulls.—13,394, S. Rideal, Manchester, Improvements in Wheel Tyres, and the Method of Attaching same.—13,397, R. A. Goodman, Halifax, an Improved Construction of Ventilator.—13,412, F. West, Lewisham, Improved Adjustable Crane, Ascending and Descending a Vertical Post, specially applicable to Concrete Building.—13,416, J. Hamblet, London, Machinery for the Manufacture of Ridge and other Roof Tiles.—13,424, C. D. Abel, London, Controlling Cover for Key-holes.—13,430, P. A. Ames, London, Construction of Ceilings and other Parts of Buildings or Structures.

Oct. 11.—13,435, J. Peachey, Worcester, Sanitary Urinals.—13,452, B. Hawerkamp, London, Improvements in Grates and Kitcheners.—13,458, G. Harsant, London; Apparatus for Supplying Disinfectants to Water in Cisterns.—13,459, G. M. Phillips and J. Millier, London, Adjustable and Removable Dip for Gullies, Drains, and Sewers.—13,472, H. Thompson, London, Improvements in Stoves and Grates.—13,474, H. H. Lake, London, Improvements in Bakers' Ovens.—13,477, J. R. Jex-Long, London, Apparatus for Dividing Timber.—13,490, W. H. Tooth, London, Heating Rooms and Buildings.

Oct. 13.—13,492, A. French and J. B. Hannay, Glasgow, Manufacture of White and other Lead Pigments, and Apparatus for same.—13,493, H. McColley, Chelsea, Manhole Covers for Drains, &c.—13,497, S. J. Chinn, Birmingham, Exhaust Ventilators.—13,500, J. T. Pearson, London, Bakers' Ovens.—13,515, A. E. Hubert and W. W. Fyfe, London, Automatic Hot-water Cistern Regulator.—13,528, W. Paulson, Mountsorrel, Ventilating Rooms and Preventing Smoke.—13,534, H. J. Hadden, London, Machinery for Dressing or Moulding Blocks of Wood and other Material.

Oct. 14.—13,544, R. M. Whitaker, Skipton, Machines for Excavating and Re-filling Drains.—13,551, W. England, jun., London, Improved Handle for Tools.—13,554, R. C. Jones and J. W. Cunningham, London, Improvements in Lock Furniture.—13,556, A. C. Carver, London, Improved Window-sash Fastener.—13,582, H. H. Lake, London, Lifting Jacks, parts of which are applicable for other purposes.—13,593, W. Hassall, London, Fireplaces or Furnaces for Heating Pottery, Bricks, and like Kilns or Ovens.

Oct. 15.—13,602, D. Allport, London, Improved Paving for Carriage-ways.—13,665, H. Nance, Liverpool, Locks and Latches.—13,621, R. G. Kirton, London, Chimney-top and Ventilator.—13,626, E. Wood, London, Composition for Washing, Renovating and Reviving all kinds of Stone Work.—13,634, C. De Bourbon, Gonzaga, London, Application of Veneers of Wood or other Substances to Cloth, Paper, or other flexible Material, for decorative purposes, and to Wood with Waterproof Glue and Cement.—13,636, F. Howcroft, London, Automatic Sash Lock.—13,646, H. C. Gilchrist, London, Gasfitters' Pliers.

Oct. 16.—13,656, E. H. Booth and F. N. Dyer, Manchester, an Improved Sanitary Appliance.—13,668, S. Willett, London, Improvements in Door-handles and their Spindles.—13,672, H. G. Appleford, Birmingham, Burners for Heating purposes.—13,684, S. Pooley, London, Machinery for Sawing Timber.—13,690, J. Waller and B. Farringdon, London, Taps and Cocks.—13,691, G. Nobes, London, Supplying Disinfecting Fluid to Water-closets and Urinals.—13,692, A. F. Dennison, London, Machinery for Cutting Wood of various Shapes for Marquetry and Parquetry Work.—13,699, H. G. Harris and G. Beavis, London, Improvements in Bakers' Ovens.—13,700, G. Coultas, London, Improvements in Pipe-joints.

PROVISIONAL SPECIFICATIONS ACCEPTED.

11,926, G. Cresswell, Brighton, Improvements in Pipes for Water-closets, &c.—11,957, S. P. Pochin, London, Improvements in Structures of Iron and Concrete, or equivalent Material.—12,143, B. P. Harris and A. Stagg, London, Kilns or Drying Floors.—12,237, J. Bartlett, London, an Improved Lift.—12,257, J. Partridge, London, Window-blinds, applicable also to Partitions or Screens.—12,364, J. Rawlings, London, Cutters for Wood-planing Machines, and an Appliance for Grinding same.—12,486, T. Freeman, jun., and E. Eardley, Hanley, Machinery and Method of Manufacturing Hollow Bricks and other Hollow Clay or Plastic Building Materials.—12,607, W. L. Wise, London, Ventilating Apparatus.—12,747, W. Shaw, Glasgow, Stoves and Cooking-ranges.—12,750, S. B. Sutcliffe, London, Construction of Wooden and other Chimneypieces.—12,767, W. D. Curzon and G. Jones, London, Manufacture of Pigments.—12,816, J. Stephens, Stonehouse, Heating Apparatus.—12,846, S. Peacock, London, Improvements in Ovens.—12,893, H. J. Hadden, London, Drying Kilns.—12,907, E. Smith, Birmingham, Appliance for Opening and Closing Windows.—12,973, H. K. Bromhead, London, Kitchen Ranges and Stoves.—13,083, S. Coombs, London, Improvements in Door-springs.—13,089, R. Hodges and J. Archer, London, Sash Fastenings.—13,112, T. S. Worthington, London, Producing Imitations of Wood and Marble on Painted and other Surfaces.—13,136, G. Grey, London, Appliance for Locking the Levers of Window-catch Fasteners.—11,113, J. Rosenthal and C. M. Rosenthal, Vienna, Fireproof Curtains for Theatres, Warehouses, and other Buildings.—11,344, W. Carron, Birmingham, Adjustable Holding and Regulating Cramp.—12,538, W. Mangnall, London. Improvements in Water-closets.—12,736, J. Blacka, Todmorden, Pointing Tool.—12,771, H. A. Stuart, Fenny Stratford, Screw Lifting-jacks.—13,033, L. Dathis, London, Bakers' Ovens.—13,143, H. Tuff and C. R. Mathews, London, Water Waste-preventers for Water-closets.—13,147, R. Oakley, London, Apparatus for Ventilating and Warming Buildings.—13,231, F. C. Hastler, London, Window Sash-fasteners.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

108, T. Jones, London, Improvements in Ventilators.—180, W. H. Baraclough, Edgbaston, Apparatus for Flushing Water-closets, &c.—259, H. H.

Bridgman, London, Improved Girder and Fireproof Floor.—260, H. H. Bridgman, London, Fireproof Floors.—326, J. Smith, Liverpool, Improvements in Fireplaces and Grates.—407, F. T. Bond, Gloucester, Stoves for Warming and Ventilating Purposes. — 2,381, C. Walton, London, Machine for Separating Clay or other Materials, from Stones or other Hard substances. — 10,853, J. Brendon, jun., and Geo. D. Brendon, Cullington, Cupboard Fasteners.—299, F. Smith, Birmingham, Raising, Lowering, and Securing Window Sashes,—519, J. Petrie, Rochdale, Heating Rooms and Buildings.—571, H. M. Ashley, Ferrybridge, Kitchen Range.—661, E. Woolfenden, Rochdale, Improved Ventilator.—723, S. Smith, Smethwick, Cooking Ranges.—887, S. Reeve, London, Warming and Ventilating Apartments and other Places.—1,046, H. Sutcliffe, Halifax, Water-closets and Apparatus connected therewith.—1,339, J. Hodgson, Birkenhead, Window Sash or other Fasteners.—9,744, T. Telford, Newcastle-on-Tyne, Chimney-tops and Apparatus connected therewith.—12,478, J. E. Hopkinson, London, Improved Roller Blind.

MEETINGS.

MONDAY, OCTOBER 27.

Inventors' Institute.—Mr. E. Guest on "Universal Visible Speech." 8 p.m.

TUESDAY, OCTOBER 28.

St. Paul's Ecclesiological Society.—Mr. Hugh Stannus on "The Decoration of St. Paul's." 7.30 p.m.

WEDNESDAY, OCTOBER 29.

Institution of Carriage Manufacturers.—The Taxes on Carriages (public meeting, Westminster Town-hall), 8 p.m.

Miscellanea.

Third-class Passenger Traffic and Railway Profits.—The returns which have just been issued show that railway shareholders continue to be mainly indebted for their dividends to third-class traffic. The total number of first-class passengers who travelled on all the railways now opened for traffic in the United Kingdom, during the half-year ending on the 30th of June last, was 16,115,749; second-class, 25,814,099; and third-class, 241,739,085; the number of third-class passengers being more than 500 per cent. in excess of first and second-class passengers combined. The relative amount of receipts is in equal proportion, those from first-class passengers being 1,658,977*l.*; second-class, 1,402,489*l.*; and third-class, 7,281,213*l.* The difference applies to all the lines in common, as a reference to the traffic on the London and North-Western and other leading lines shows. Thus, on the London and North-Western line the number of first-class passengers was 1,139,500; second-class, 1,946,000; third-class, 22,841,751; and the receipts from first-class passengers, 241,534*l.*; second-class, 172,710*l.*; and third-class, 1,007,950*l.* The figures given in connexion with the traffic on the Great Western, Great Northern, Great Eastern, Midland, South-Western, and the whole of the other lines having their termini in the metropolis show similar results. The North London line returns are specially striking, the receipts from first and second-class passengers being 16,768*l.*, whilst those from third-class passengers amounted to 128,590*l.*, or about 800 per cent. more than from first and second-class combined. Within the period named the Metropolitan and Metropolitan District Companies and the North London Company carried upwards of 50,000,000 passengers, to which must be added, as showing the enormous traffic within the area of the metropolis, that of the Great Eastern, London, Chatham, and Dover, London and Brighton, and the South-Western and South-Eastern companies, a large portion of which is purely metropolitan.

The Nineteenth Century Art Society.—Saturday, November 1st, has been appointed for the private view of the Autumn Exhibition of the Nineteenth Century Art Society at the Conduit-street Galleries, and the Exhibition will be open to the public on Monday, November 3rd.

Inventors' Institute.—The opening of the session will take place at Lonsdale-chambers, Chancery-lane, at eight p.m. on Monday next, when, after a brief address by Admiral Selwyn, Mr. E. Guest will read a paper on "Universal Visible Speech," introducing, in illustration, one of Farini's dwarf Earthmen, from the Aquarium.

The Surveyors' Institution.—The first ordinary general meeting of the Session will be held on Monday, November 10th, when the president, Mr. T. Smith Woolley, will open the Session with an address.

New Office Buildings in Basinghall-street.—An extensive and striking block of new buildings is at present in course of erection in Basinghall-street, having a frontage of 62 ft. to that thoroughfare. The buildings are Flemish in style, and are faced with Dumfries stone and Portland cement. They contain six floors above the ground-line, and a deep basement. The main elevation, containing four of the floors, is 50 ft. high, the extreme height to the apex of the stepped gable in the centre of the frontage being 76 ft. The buildings are being erected in two divisions, and under separate contracts, one of the divisions being now almost completed and ready for occupation. The ground-floor of this division has two spacious windows on each side of an entrance 11 ft. in width, which is very elaborately treated. This portion of the frontage, up to the top of the first floor, is constructed in a recess about 4 ft. in depth to the rear of the main face of the building. Immediately over the entrance is an enriched moulded cove in fibrous plaster, containing work in relief, specially designed and modelled by Messrs. Daymond & Son, of Vauxhall Bridge-road. Immediately above the entrance, within the recess already named, there are octagonal piers alternately in Dumfries stone and Portland cement surmounted by hoods or turrets, and above these, on a level with the upper part of the second floor, there is a central arch in Dumfries stone. The treatment, architecturally, of the building within the recess is a special feature in the structure. The several floors have two and three-light mullion windows, and in the glazing and other details the character of the style of architecture adopted is maintained. The interior is arranged in suites of offices, of which there are a large number, admirably lighted from the rear as well as from the front of the building. All the offices are fitted with slow-combustion stoves, supplied by Messrs. George Wright & Co. Mr. R. M. Roe, A.R.I.B.A., of Basinghall-street, is the architect, the contractor for that portion of the block now nearly finished being Mr. J. Grover, of the Wilford Works, New North-road, and for the other portion, Messrs. Larke & Son, of Fore-street, E.C. The cost of the entire block will be about 8,000*l.*

Technical Education for Carpenters and Joiners at the Health Exhibition.—Some instructive diagrams and models in wood, illustrating the principles of carpentry and joinery, are exhibited in one of the rooms containing the Finsbury Technical College exhibit, by Mr. Staynes. The drawing and model of a splayed lining to an "ellipse on circle" frame shows all the working lines for the construction of this difficult piece of work. A very difficult case of raking moulding is shown. The angle between the walls is an obtuse angle; both mouldings are on the rake, and the rake of one is greater than that of the other. The drawing and model of a piece of handrail show the theory of the tangent system of handrailing, the drawing giving the tangents, pitch of the plank, face mould, bevels, the thickness of the plank, and the width of the cutting-out mould, while the model shows the application of moulds and bevels, and it can be taken to pieces so that the manipulation can be clearly illustrated. The model of a piece of "circle on circle" work, made by one of the first-year students of Mr. Staynes at Finsbury College, shows, at the different stages of construction, the application of the various moulds and bevels.

New Public Hall and Assembly-rooms at Streatham. — The great expansion of Streatham, and the increase of its population, which has been going forward during the last few years, has led to a determination to erect a new public hall in the parish, which is about to be carried out. Three large estates in the neighbourhood have been laid out for building purposes within the last three or four years, and on two of these upwards of 600 houses have already been erected. Upon a third estate, the Manor Park Estate, recently laid out, building is at present actively going forward. About 100 houses have already been built. In one of the main roads of this estate, and conveniently situated near the railway station, the public hall is to be erected. The building will contain a large public hall and assembly-rooms for public meetings and entertainments, with reading-room, smoking-rooms, chess-rooms, committee-rooms, &c. The ground-floor will consist of shops. Messrs. Wheeler & Holland, of Cheapside, who have designed the buildings which have so far been erected on the estate, are the architects.

The Width of Streets.—Much advance has been made during recent years in securing increased space about inhabited dwellings, and modern regulations require that a certain minimum of space shall be given in the rear of houses, and also to the front, the width of the street being taken into account as regards the latter space. But in the State of Illinois the excessive width of the streets is reported as having of itself become a source of nuisance and of danger to health. Sixty feet and more are ordinarily given to new streets, even in the smaller towns; 8 ft. on each side are paved and devoted to pedestrians, and the remaining space, varying usually from 44 ft. to 54 ft., is devoted to carriage traffic. The result is that this wide carriage-road, so often in excess of the requirements of the vehicles that have to travel over it, becomes a source of such expense as to forbid its being properly paved, cleansed, and channelled. The street, consequently, is soon turned into a vast surface of dirt mixed with filth, horse droppings, and other refuse, and when the weather is so dry that dust is formed, the air which is inhaled as the dust flies about is calculated to bring about disease as well as discomfort, instead of promoting the health of pedestrians. Dr. Gregory, in bringing forward this subject, fully concurs in the great importance of providing wide thoroughfares, and of keeping the number of inhabitants to each acre down to a proper maximum, and hence he declares that he would not on any consideration diminish by a single foot the width of the streets. But he would curtail the actual roadway, so that it shall only suffice for the proper demands of the carriage traffic; and between that limited space, which could then be properly kept at a reasonable cost, and the footpaths, he would plant trees and lay down grass, so as really to provide in towns and cities such freshness and greenness as would go far to induce people to take that form of exercise which is most conducive to health.—*The Lancet.*

Wellington College.—The Governors of this College have recently completed extensive sewerage and water-works schemes at the above. An entirely new system of sewer and rain-water pipes has been laid. The sewage gravitates to the purification works, consisting of mixing-house, precipitating-tanks, and sludge-pits, about one mile and a quarter from the College, where it is dealt with by the Native Guano Company under their patent process. The rain-water is collected in a large underground reservoir, near the recently-erected laundry, and is used for washing purposes. The water-supply is now also completed; the water is pumped to Edge Barrow-hill, about three-quarters of a mile from the College, where circulating reservoir filter-beds and clean water storage-reservoir have been constructed. The existing well has been relined with iron cylinders, 6 ft. in diameter; the well is about 250 ft. deep. Extensive sanitary alterations in the interior of the College have also been executed. The engineer was Mr. Baldwin Latham, C.E., F.G.S., &c. The resident engineer was Mr. Sydney Lowcock. The contractors were Messrs. B. Cooke & Co., of Battersea, whose contract amounted to about 12,000*l.*

Messrs. Chubb & Son and their Workpeople.—The new building for the coffee-tavern and workmen's dwellings in connexion with Messrs. Chubb & Son's Safe Works, Glengall-road, Old Kent-road, London, is now well advanced, and will be completed by Christmas. We are pleased to note that arrangements are being made to form a large and complete library for the workpeople and their families; and the first book presented to it is a copy of the Queen's latest work, which her Majesty sent to the workmen quite unsolicited, the title-page bearing an inscription with her autograph. We are told that the building contains several novel features of interest, so that it will, when complete, repay a visit to those interested in such matters. The architect is Mr. Elijah Hoole, of Great Russell-street; and the builder is Mr. Edward Edwards, of Leighton-road, Kentish Town, N.W.

Dublin Artisans' Dwellings Company.—The secretary of this company writes, in reference to a remark in our leading article of the 4th inst., that it is incorrect that any members of the Corporation of Dublin are shareholders in the Artisans' Dwellings Company. We of course made the statement on what we believed to be trustworthy information.

Association of Municipal and Sanitary Engineers and Surveyors.—A meeting of the members of the northern district of the Association of Municipal and Sanitary Engineers and Surveyors was held at Stockton on Saturday last. Mr. Laws, M.I.C.E., city engineer of Newcastle, and president of the Association, presided. The mayor heartily welcomed the members to Stockton. Mr. J. W. Thomson, of Willington Quay, was unanimously re-elected hon. secretary to the district. The president briefly addressed the meeting, and urged that the Association should apply for a charter of incorporation to enable them to conduct examinations and grant certificates. If they should not take this step, he thought the Local Government Board would institute examinations. As to the suggestion that sanitary engineers and surveyors should not be liable to be discharged without the consent of the Local Government Board, he disapproved of it, because he thought a powerful association would be able to protect its own members if they were competent. After visting the Tees conservancy works the members dined together.

St. Austell.—The parishioners of Holy Trinity Church, St. Austell, Cornwall, have just erected a four-light Munich stained-glass window, by Messrs. Mayer & Co., to the memory of the late Rev. Fortescue Todd, vicar from 1838 to 1881.

Richhill (Co. Armagh).—A window has been erected in the transept of Richhill Church, in memory of the late Mrs. Bacon, by the friends, parishioners, and tenantry. It is a three-light window in the Perpendicular style of architecture, with a number of openings in the tracery. The subjects chosen in the upper part of the design are figures representing "Faith," "Love," and "Hope," with typical subjects in the base of "The Marriage Feast at Cana," "Our Lord healing the Sick in the Temple," and "Our Lord raising the Widow's Son." In the upper part of the tracery are "Angels holding emblems of purity," "Angels in prayer," and in the centre an angel holding the celestial crown. The work has been executed by Mr. James Cameron, of Wigmore-street, London.

Pulpit, St. John's Wood.—A circular pulpit, in alabaster, to the memory of the late Mr. Edmund Robins, has recently been erected in All Souls' Church, St. John's Wood. The work has been executed by Messrs. Farmer & Brindley, of Westminster Bridge-road, from the designs of Messrs. Wadmore & Baker, of 35, Great St. Helen's, London.

West Hartlepool.—Plans for considerably extending the business premises of Messrs. J. Backhouse & Co. have been approved of by the Commissioners, Mr. G. G. Hoskins, F.R.I.B.A., of Darlington, being the architect.

COMPETITIONS, CONTRACTS, & PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Wrought-Iron Bridge	Swindon New Twn. L. B.	25*l.*	Dec. 1st	i.
School at Great Horton	Bradford School Board	Not stated	do.	i.
Pier and Landing-stage, Ventnor	Ventnor Local Board ...	.....	Dec. 8th	i.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Sinking Well	Teignmouth Local Brd	Geo. Crow	October 25th	xviii.
Drainage Works	do.	do.	do.	xviii.
Broken Guernsey Granite	Milton Imprvmnt Com.	H. W. Clarke	October 27th	ii.
Making-up Roads	Wandsworth B. of Wks.	*Official*	October 28th	xviii.
Road Making and Paving	Fulham Board of Wrks	do.	October 29th	ii.
Road Making	Dartford Local Board	do.	do.	ii.
Small House, Ratcliffe	.....	— Sargeant	do.	xviii.
Preparing Foundations, &c., at Infirmary	Grdns. of Fulham Un.	do.	October 30th	xviii.
Boundary-Walls and Railing, &c.	Waltham Holy Cross Burial Board	C. W. Wiggs	Nov. 3rd	ii.
Farmhouse, &c., Fulstow	Trustees of A. H. Allenby	E. W. Farebrother	do.	ii.
Outfall Sewers	Frome Local Board	P. Edinger	do.	xviii.
Foundations of Assembly-Rooms, Gillingham	J. L. Jayrell	Margetts & Co.	do.	xviii.
Steam-Roller	Acton Local Board	.....	Nov. 4th	xviii.
Beech Wedges	Admiralty	*Official*	do.	ii.
Cast-Iron Work	Commissnrs of Sewers, City of London	do.	do.	ii.
Concrete, Brick, and Pipe Sewers, &c.	Romford R. S. A.	Brundell, Simmons, & Brundell	do.	ii.
Paving	Southwark Vestry	*Official*	do.	xviii.
Erection of Baths, &c.	City of Newcastle-on-Tyne	Gibson & Allan	Nov. 5th	ii.
Additions and Alterations, Wadhurst	Captain Walker	H. M. Caley	do.	xviii.
Broken Granite	Walthamstow Lcl. Bd.	*Official*	Nov. 6th	ii.
Stone Paving	Dartford Local Board	do.	Nov. 7th	ii.
Broken Granite	do.	do.	do.	ii.
Factory, Vauxhall	Barrett's Bottling Co.	Hilton & Rawlings	Nov. 10th	xviii.
New Post-office, Bradford	Commissnrs. of Works	*Official*	do.	ii.
Bridge on Filsham Estate	Owners	Elworthy & Son	do.	ii.
Granite, Gravel, Flints	Croydon Corporation ...	*Official*	Nov. 11th	ii.
Widening Line	Great Western Ry. Co.	do.	do.	ii.
Construction of Embankment	Rochester Corporation	W. Banks	Nov. 17th	xviii.
Construction of Sewer	Met. Board of Works	*Official*	Nov. 28th	i.
Stores and Materials	Cheshire Lines Com....	.....	Dec. 1st	ii.
Main Drainage Works	Acton Local Board	*Official*	Dec. 2nd	xviii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Applications to be in.	Salary.	Page.
Surveyor, &c.	Wantage Improvement Commissioners	Nov. 1st	100*l.* per annum	xvi.

TENDERS.

For laundry to be erected in the rear of Ebenezer-terrace, Kennington-road, for Mr. C. Zierenberg. Mr. Banister Fletcher, architect:—

Blyton	£917 0 0
Mills	876 0 0
Parker	799 0 0
Towner & Patten	765 0 0
Burman & Sons	749 0 0
Buchan	695 0 0
Andrews (accepted)	679 0 0
Aldridge & Jenvey	673 8 0

For additions to "Anglebay," Woodchurch-road, West Hampstead, for Mr. Banister Fletcher:—

J. Mansbridge (accepted)	£220 0 0

For shops to be erected in Brent-street, Hendon. Second contract. Mr. Banister Fletcher, architect:—

J. Ellacott (accepted)	£1,400 0 0

For the erection of a house in the Royal-road, Kennington, for Mr. C. Zierenberg. Mr. Banister Fletcher, architect:—

	Smaller House.	Larger House.
Mills	£800	£940
Towner & Patten	798	937
Parker	799	—
Blyton	799	890
Burman & Sons	705	767
Aldridge & Jenvey	640	719
Andrews	598	671
Buchan	594	665

For the erection of a villa at Goring, Oxon., for Mr. E. H. Bayldon. Mr. J. S. Dodd, architect, Reading:—

T. Higgs, Goring	£2,374 0 0
W. Brasher & Son, Wallingford	2,285 0 0
T. H. Kingerlee, Oxford	2,195 0 0
G. Wernham, Reading	2,166 0 0
J. Bottrill, Reading	2,098 0 0
W. H. Simmonds (accepted)	1,987 0 0

For the execution of sewage and outfall works at Farnborough, for the Hartley Wintney Union Sanitary Authority. Mr. J. R. Sisterson, surveyor:—

Bottoms Bros., Battersea	£2,280 0 0
L. H. Green, Epping	2,250 0 0
Bath & Blackmore, Clapham	2,162 0 0
John Howard, Basinghall-street, London	2,042 9 8
J. Hughes, Aldershot	2,010 0 0
T. P. Hall, Portsmouth	1,874 0 0
T. Adams, Moorgate-street, London.	1,794 0 0
T. B. Hayter, Landport	1,742 0 0
J. Hayward, Eastbourne	1,737 0 0
Crook & Smith, Southampton	1,693 0 0
B. Cooke & Co., Battersea	1,670 0 0
Evans Bros., Wallingford	1,618 11 8
Geo. Smith, Newcastle-on-Tyne	1,603 3 5
J. Pool & Son, Hartley Wintney	1,525 0 0
H. J. Saunders, Northam, Southampton	1,498 0 0
Martin, Wells, & Co., Aldershot	1,428 0 0
Jas. Young & Co., Skegness	1,330 0 0
R. C. Trimm, Hersham, Walton-on-Thames (accepted conditionally)	1,288 0 0

For supplying and laying cast-iron pipes, &c., at Hartley Row, for the Hartley Wintney Union Sanitary Authority:—

Bath & Blackmore, Clapham	£2,493 0 0
J. S. Stidder & Co., Southwark Bridge-road	1,650 0 0
Martin, Wells, & Co., Aldershot	1,558 0 0
G. E. Child, Southwold	1,540 18 3
S. Chandler & Sons, Kennington Oval	1,428 18 0
T. P. Hall, Portsmouth	1,410 4 0
J. Wood, York Town	1,370 2 2
Green & Burleigh, Upper Thames-street	1,360 0 0
Bottoms Bros., Battersea	1,358 0 0
R. Laidlaw & Son, Cannon-street	1,296 7 0
B. Cooke & Co., Battersea	1,280 0 0
Crook & Smith, Southampton	1,256 0 0
L. H. Green, Dartford	1,235 7 5
H. Young & Co., Pimlico	1,235 0 0
Evans Bros., Wallingford	1,215 11 0
John Howard, Basinghall-street	1,190 0 0
G. Smith, Newcastle-on-Tyne	1,162 15 6
H. J. Saunders, Northam, Southampton	1,158 0 0
J. Young & Co., Skegness	1,154 2 6
Jas. Proctor, Sutton, Surrey	1,099 8 7
Jas. Pool & Son,* Hartley Wintney	1,040 0 0
R. C. Primm, Hersham, Walton-on-Thames	1,019 0 0
F. Greenaway, Slough ....per yard	3s. and 3s. 4d.

* Accepted.

For the erection of a block of dwellings and offices in Camberwell New-road, for the London Tramways Company (Limited). Messrs. Ward & Clarke, architects, 2, Lancaster-place, Strand:—

Barrie Bros.	£2,596 0 0
Richards	2,587 0 0
Belham & Co.	2,559 0 0
Downs	2,550 0 0
Blasby	2,535 0 0
Colls & Sons	2,486 0 0
Burman & Sons	2,463 0 0
Priestley	2,390 0 0
Holliday & Greenwood	2,357 0 0
Sabey & Son	2,349 0 0
Stimpson & Co.	2,343 0 0
Balaam Bros. (accepted)	2,200 0 0

For alterations and decorations to No. 47, Longridge-road, Earl's Court, for Mrs. Kennett. Mr. Alfred Wright, architect, 190A, Brompton-road, S.W.:—

Hayden	£433 0 0
Cook	319 0 0
Johnson	289 0 0
Kent & Wilkins	270 0 0
Hunt	245 0 0

For the erection of a new vicarage, Beguildy, Radnorshire. Mr. E. H. Lingen-Barker, architect:—

Price & Deakin, Knucklas, Knighton	£1,657 0 0
J. Williams, Knighton	1,578 0 0
Davies & Son, Newtown, Montgomery	1,541 0 0
W. Dowland, Kenilworth (accepted)	1,496 0 0

For the construction of about three miles and a half of single line of tramway in Rea-street; High-street, Deritend; High-street, Bordesley; Camp Hill; Bradford-street; Kyott's Lake-road, and Stratford-road, for the Corporation of the Borough of Birmingham:—

Jacob Biggs, 3, Villa-road, Handsworth (accepted).*

* At schedule of prices.

For the erection of a new convent and chapel upon the Bowling-green Estate, in Queen-street, Scarborough, Yorkshire. Mr. Fredk. A. Walters, A.R.I.B.A., architect, 4, Great Queen-street, Westminster, London. Quantities supplied by Mr. W. H. Brayshaw:—

John Barry (accepted)	£11,286 10 0

For college and hall at Hampstead, for Mr. J. Haysman. Mr. Banister Fletcher, architect:—

Groom, Rowland, & Co.	£6,634 0 0
W. Downs	6,543 0 0
Castle	6,490 0 0
Tozer	6,433 10 0
Mansbridge	6,425 0 0
Parker	5,900 0 0
Hayes	5,800 0 0
Couzens & Simmons	5,255 0 0
Aldridge & Jenvey (accepted)	4,989 13 0
Scharien & Williams	4,759 0 0

For alterations to No. 44, Fish-street-hill, E.C. Mr. Edward Power, architect, 16, King William-street, E.C. Quantities by Mr. W. Barnett :—

B. E. Nightingale	£1,507	0	0
R. Conder	1,395	0	0
Burch & Co.	1,297	0	0
J. R. Hunt	1,249	0	0
J. & J. Greenwood	1,212	0	0
J. Dover	1,200	0	0
Fuller (too late)	1,200	0	0
W. Shurmur	1,188	0	0
Hill & Berridge	1,150	0	0
J. O. Richardson	1,059	0	0

For alterations, &c., at Richmond-road, Barnsbury, for Dr. Wilkinson. Mr. W. Smith, architect :—

Wood	£205	0	0
Oldis	201	0	0
Matthews	193	0	0
Larke	180	0	0
Hewitt	177	0	0
Dearing & Son	176	5	6
Duncan & Lang	160	0	0
Stevens	156	0	0

Accepted for the erection of storehouse, coachhouse, stables, &c., being the first portion of new brewery stores, London-road, Enfield, for Messrs. Savill Brothers. Mr. Frederick A. Ashton, architect, Stratford :—

J. Hearle & Son	£750	0	0

Accepted for the erection of committee-rooms, class-rooms, and caretaker's apartments (Contract No. 2), for the Building Committee of St. Barnabas's Schools, Homerton. Mr. E. Witts, architect. Quantities supplied :—

Stimpson & Co.	£1,539	0	0

For converting three houses into shops near Clapham Junction. Mr. Thomas Spearing, surveyor :—

J. Munday	£750	0	0
Samuel Steel	750	0	0
Jones & Edwards	590	0	0
B. Bookj	469	0	0
Robinson & Miller	475	0	0
Howard	441	0	0
Saunders & Co.	405	0	0
Rudd	400	0	0
Thompson & Co.	398	0	0
W. Ellis	390	0	0
F. Warr	360	0	0
R. Smith	350	0	0
Hughes & Davis	348	0	0
Baker	330	0	0
Scharien & Williams	317	0	0
Coussens & Simmons	295	0	0
Stewart & Co (accepted)	245	0	0
C. J. Rand	225	0	0

For alterations, &c., at No. 480, Kingsland-road, for Messrs. A. & W. Flatau. Mr. T. E. Knightley, architect:—

Greenwood	£717	0	0
Ashby	696	0	0
Staines & Son	594	0	0
Staines & Son* (reduced estimate)	382	0	0

* Accepted.

For alterations and additions to the Wesleyan Sunday Schools, Ramsgate. Mr. E. L. Elgar, architect :—

Bugden	£535	0	0
Smith	497	10	0
Port	420	0	0
Martin	419	10	0
Grummant	370	0	0
Bowman	339	0	0
Miller	310	0	0

For alterations to wine cellars, and building chimney-shaft, for Messrs. Westwall & Co., Ramsgate. Messrs. Hinds & Son, architects :—

Smith	£1,365	0	0 !
Miller	900	0	0
Bowman	879	0	0
Newby Bros.	876	10	0
Home	665	0	0
Grummant	594	0	0
Martin (accepted)	532	0	0 !

For heating with hot water Hope Church, North Wales. Mr. J. Oldrid Scott, 31, Spring-gardens, London, architect :—

Messenger & Co.,* Loughborough	£95	17	6

* Accepted.

For erecting cement concrete sea-wall, groyne, and other works, for the Commissioners of Highways, on the shore near the Granite foot, Sandown Plains, Isle of Wight. Quantities by the surveyor, Mr. E. Humphryes, East Medina District :—

T. Hall, Portsmouth	£918	15	0
T. B. Hayton, Portsmouth	835	0	0
T. Jenkins, Newport	760	0	0
G. Hales, Shanklin	695	0	0
T. Hayden, Sandown	625	0	0
E. Pritchard, Sandown (accepted)	615	10	0
J. White, Sandown	720	0	0
T. Barton, Ryde	594	10	0

[Mr. Barton's tender was first accepted, but was thrown out on account of not naming sureties at the time of tendering, in accordance with specification.]

For two new shops, Brixton-road, for Mr. F. Bird. Messrs. Fowler & Hill, architects. Quantities supplied :—

W. King & Son	£2,900	0	0
W. Drown	2,885	0	0
Jas. Carpenter	2,796	0	0
John Dickison	2,690	0	0
Pack Bros. (accepted)	2,473	0	0

Accepted for storage water-tanks, &c., at the Ipswich Borough Asylum. Mr. E. Buckham, surveyor :—

Crisp & Smith	£251	0	0

[Amended price for $\frac{5}{16}$ in. tanks.]

For works to Cobden-road, Sevenoaks, Kent, in forming, metalling, kerbing, channelling, storm-water drain, gullies, &c., for the Sevenoaks Local Board. Mr. Jabez Mann, surveyor :—

H. Owen, Sevenoaks	£561	16	6
W. J. Botterill, Sevenoaks and London (accepted)	405	0	0

[Surveyor's estimate, 496*l.*]

For the construction of 106 lineal yards of glazed earthenware pipe sewer, with manhole and lamphole, in a portion of the Gordon-road, Sevenoaks, Kent. Mr. Jabez Mann, surveyor :—

H. J. Botterill, Sevenoaks and London	£85	0	0
Chas. King, Sevenoaks	68	16	4
H. Robbins, Sevenoaks	62	9	0
H. Owen, Sevenoaks (accepted)	53	16	0

[Surveyor's estimate, 70*l.*]

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

PUBLISHER'S NOTICES.

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DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher No. 46, Catherine-street, W.C

TO CORRESPONDENTS.

E. and R. (our advertising columns are open).—J. W. S. (under our mark).—W. G.'s Exors. (amounts should be sent).—R. T. E. (too late for this week).—F. C. P.—J. C.—E. G.—H. H.—J. H.—W. J.—W. G.—E. W. C.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [Advt.

Box Ground Stone
Is the Best for Use in all Exposed Positions, being a well-known and tried Weather Stone.
50,000 feet cube in stock.
PICTOR & SONS, BOX, WILTS. [Advt.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster, Somerset. — Agent, Mr. E. WILLIAMS, 16, Craven-street, Strand, W.C. [Advt.

Doulting Free Stone
HAM HILL STONE,
BLUE LIAS LIME
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